

**CITY OF IONIA**

**MUNICIPAL STANDARDS**

**JULY 2006**  
**PROJECT NO. G06043**

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CHAPTER 1  
GENERAL INFORMATION

## **CHAPTER 1 - GENERAL INFORMATION**

### **INTRODUCTION**

The design and construction standards for land development contained in this publication are intended as guidelines to be used by the developer in the preparation of drawings and specifications for all proposed developments in the City of Ionia (City or Municipality). These developments include, but are not limited to; residential plats, site condominiums, apartments, condominiums, commercial development, and industrial development. The City of Ionia Municipal Standards (Municipal Standards) are to be used in conjunction with local zoning and subdivision ordinances, the State of Michigan Land Division Act, and other applicable state and local regulations to produce residential, commercial, and industrial developments which conform to the City's requirements.

Where reference is made to specifications and standards, it is understood to mean the latest revision. Whenever reference is made to specifications other than those contained herein, said specifications shall apply and be binding as if fully repeated herein.

## DEFINITIONS

AWWA - American Waterworks Association

BOCA - Building Officials and Code Administration

CITY - City of Ionia, Michigan

CONTRACTOR - The person, firm, or corporation engaged by the developer for construction services in conjunction with the proposed land development.

DESIGN ENGINEER - The engineer engaged by the developer to prepare drawings and specifications for the proposed development.

ENGINEER OR MUNICIPAL ENGINEER - The person, firm, or corporation empowered by the Municipality to provide the required engineering review and inspection services.

OWNER OR DEVELOPER - A natural person, firm, corporation, association, partnership, or other entity who proposes subdivision or other land development and/or municipal improvements, and who either has an ownership interest therein or is authorized to act as an agent with respect thereto for an entity having such ownership interest.

MDEQ - Michigan Department of Environmental Quality

MDOT - Michigan Department of Transportation

MUNICIPALITY - City of Ionia, Michigan

NAVD 88 - North American Vertical Datum of 1988

NEC - National Electrical Code

STANDARDS - "Municipal Standards" hereafter, the minimum standards for design and construction of subdivisions and land development projects.

RPZ - Reduced Pressure Zone

SESC - Soil Erosion and Sedimentation Control

STATE - State of Michigan

## **REGULATORY REQUIREMENTS**

The developer is responsible to secure all permits required to construct the proposed project. This includes completing the permit applications and payment of all related fees. The City will be required to sign certain permits and in these instances, will review the permit for conformance with the permit requirements prior to signing the permit.

The following is a discussion of some of the regulatory requirements and permits that a developer may be required to comply with prior to construction. If regulatory requirements exist that are not identified below, it is the developer's responsibility to comply with these requirements.

### **LAND DIVISION ACT**

The Michigan Legislature enacted the Land Division Act that gives the local units of government in Michigan the authority required to ensure that new subdivisions conform to sound subdivision practices, retain their beauty and value, and that they remain an asset to the community.

A manual of instructions for implementing the Land Division Act is available from the State Department of Consumer and Industry Services Corporation Securities and Land Development Bureau. The manual of instructions includes step-by-step regulations for preparation of the preliminary and final plats, as well as the rules and regulations of the Michigan Department of Treasury (MDOT) and Michigan Department of Environmental Quality (MDEQ).

### **INLAND LAKES AND STREAMS ACT**

The Inland Lakes and Streams Act was enacted to control construction operations in and adjacent to lakes and streams. A construction permit may be required and can be obtained from the MDEQ. All MDEQ permits for submerged stream crossings and culvert and bridge construction shall also be obtained by the developer.

### **WETLAND PROTECTION ACT**

Act 203 of 1979 was established to control construction within regulated wetlands in Michigan. As applicable, the developer will be required to obtain permits under Act 203.

### **FLOODPLAIN REGULATORY AUTHORITY**

Work and/or construction within floodplain areas are regulated by MDEQ as authorized by PA 245 of 1929 and PA 167 of 1968. The developer will be required to obtain permits, as applicable, for work or construction with floodplain areas.



## SOIL EROSION AND SEDIMENTATION CONTROL ACT

The Soil Erosion and Sediment Control (SESC) Act was enacted to control soil erosion and sedimentation which could enter the State of Michigan (State) watercourses through public or private construction operations. Any construction involving an “earth change” as defined in the SESC, must obtain a construction permit from the county-enforcing agency. The agent for Act 347 is the office of the Ionia County Drain Commissioner. Developers are directed to contact the City of Ionia Building and Zoning Department for permit applications and additional information.

## STATE AND LOCAL BUILDING CODES

The City has adopted the 2000 international codes for basic building, mechanical, and plumbing codes. Electrical work shall conform to the National Electrical Code (NEC).

## UNDERGROUND UTILITIES ACT, PUBLIC ACT 53 OF 1974

The Underground Utilities Act, Public Act 53 of 1974 was enacted to require notification of local public, quasi public, and private utilities of excavation in the area of their facilities.

## CITY CODES AND ORDINANCES

The City enforces the most current State approved version of the Uniform Code Council for mechanical and plumbing work and NEC for electrical work.

In addition to these Municipal Standards, the City has a comprehensive zoning and planning ordinance which outlines the permitted land use procedure, design requirements, review fees, and penalties for violation of the ordinance. Developers are encouraged to review the requirements of the applicable ordinance(s) at the outset of their planning and design work.

Developers shall complete the applicable forms for the City of Ionia/Township - Utility Site Plan Review Application/Checklist and provide payment in the appropriate amount to the City to have the municipal utility drawings or the site plan reviewed. **If an application form and payment are not provided, the reviews and approvals for the project may not be performed.** An example of the City of Ionia/Township - Utility Site Plan Review Application/Checklist is provided on the following pages.

## SANITARY SEWER AND WATER MAIN PERMITS

Upon receipt of approved drawings and specifications from the developer, the developer shall then prepare the MDEQ Permit Applications for Water and/or Wastewater Systems, as applicable. The developer shall provide the City with a minimum of 12 sets of drawings stamped by a registered engineer for submittal with the permit application. The City will review the permit application, and if acceptable, sign it and forward the application and drawings to the MDEQ, for water main and/or sanitary sewer construction permit.

**CITY OF IONIA/TOWNSHIP UTILITY SITE PLAN REVIEW  
APPLICATION/CHECKLIST**

**Application for City Utility Services**

1. Applicant Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone: (HOME) \_\_\_\_\_ (BUS.) \_\_\_\_\_  
Applicant's interest in property: \_\_\_\_\_
2. Owner Name (if different from above): \_\_\_\_\_
3. Request:  
Utility-Water                      Utility-Sanitary Sewer  
Utility-Storm Water              Compliance With Municipal Standards  
Submit for State Permits              Other  
Project Description: \_\_\_\_\_
4. Address of Property: \_\_\_\_\_
5. Legal Description: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
6. Size of Parcel: \_\_\_\_\_

**By signing this agreement the applicant/owner agrees to pay the \$250 application fee plus a \$2,000 deposit . Prior to any work taking place, developers shall place the \$2,000.00 in an escrow account to cover the following costs:**

- A. Staff time;  
B. Engineering reviews by the City Engineer on water supply and sanitary sewer system  
etc.  
C. Any attorney fees associated with developments.

**Note: The purpose of this fee is to cover the City's costs in reviewing development that will utilize the City's water system as well as the collective sanitary sewer collection system. Attorney fees, staff time, and engineering studies shall be reimbursed to the City. At such point as the escrow amount is used, no further work will progress until another deposit is provided to the account. In no case shall the City or Townships subsidize such reviews or conduct such reviews without escrow funds in place. In addition, all development shall be recorded in a data base format than can be utilized by the City's Geographic Information System. Failure to provide data and as-builts in this format shall result in the City performing the work and billing the developer/account. If sufficient funds do not exist, final connections, taps and occupancy permits shall not be granted.**

**(Res. 07-2002-01R. Passed 7-2-02.)**

**No oral order, objection, claim, or notice by any party shall affect or modify any of the requirements of the Municipal Standards or other related ordinances and regulations.**

8. Applicant's Signature: \_\_\_\_\_ (DATE) \_\_\_\_\_
9. Property Owner's Signature: \_\_\_\_\_ (DATE) \_\_\_\_\_

**OFFICE USE ONLY**

Application #: \_\_\_\_\_

City Manager Approval: \_\_\_\_\_

Date: \_\_\_\_\_

\$250 Fee Paid: \_\_\_\_\_

Initial Deposit Paid: \_\_\_\_\_

Final Approval/Fees paid    Yes    No

Date: \_\_\_\_\_

EXAMPLE

**CITY OF IONIA**

**SITE PLAN UTILITY REVIEW PROCESS**

**I. Site Plan Required**

EXAMPLE

# CITY OF IONIA

## Site Plan Check List

A site plan submitted for review by the City of Ionia Planning Commission must contain the following items unless the Commission determines such items are not needed on the plan. This list is taken from Section 5.139 of the City of Ionia Zoning Ordinance.

- 
- 
- |   |   |
|---|---|
| <input type="checkbox"/> Scale (not more than 1" – 100 ft.).  | <input type="checkbox"/> Location of septic tanks and drainfields.  |
| <input type="checkbox"/> A vicinity map.  | <input type="checkbox"/> Location of utility easements.   |
| <input type="checkbox"/> Date site plan was prepared.   | <input type="checkbox"/> Location of all sidewalks.   |
| <input type="checkbox"/> Name, address & seal of preparer.  | <input type="checkbox"/> Location of all bike paths or walkways.  |
| <input type="checkbox"/> North arrow.   | <input type="checkbox"/> Location and size of any walls, fences or other screening provisions.                    |
| <input type="checkbox"/> Legal description.   | <input type="checkbox"/> Location of all proposed landscape materials, including size and type of planting.       |
| <input type="checkbox"/> Property lines and dimensions.   | <input type="checkbox"/> Location of all proposed accessory structures.   |
| <input type="checkbox"/> Building setback distances.  | <input type="checkbox"/> Location of all light poles or fixtures including type.                                  |
| <input type="checkbox"/> All structures, lot lines & wetlands within 100 feet of the site.  | <input type="checkbox"/> Location of all flagpoles.   |
| <input type="checkbox"/> Existing & proposed topographic elevations at two foot intervals on the site & to a distance of 50 ft. outside the boundaries. | <input type="checkbox"/> Location of all storage sheds.   |
| <input type="checkbox"/> Identify all slopes 20% or more.   | <input type="checkbox"/> Location of all transformers.  |
| <input type="checkbox"/> Direction of storm water drainage & how storm water runoff will be handled.  | <input type="checkbox"/> Location of all dumpsters or trash removal areas or devices. Dumpsters must be screened. |
| <input type="checkbox"/> Location of existing buildings.  | <input type="checkbox"/> Location of all signs.   |
| <input type="checkbox"/> Location of proposed buildings.  | <input type="checkbox"/> Location of all existing and proposed utility poles.                                     |
| <input type="checkbox"/> Intended use of proposed buildings.  | <input type="checkbox"/> Location of proposed parking areas & access drives.                                      |
| <input type="checkbox"/> Length & width of proposed buildings.  | <input type="checkbox"/> Number of parking spaces & aisles.   |

- |   |  |
|---|--|
| ___ Height of proposed buildings.                                     | ___ Dimensions of spaces & aisles.   |
| ___ Square footage of proposed buildings.                             | ___ Location of parking blocks, landscape, timbers, etc.   |
| ___ First floor elevation of each building.                           | ___ Location of loading areas.   |
| ___ Location of abutting streets.                                     | ___ Location of parking islands.   |
| ___ Location of rights-of-way.  | ___ Location of handicapped spaces & access ramps.   |
| ___ Location of service drives.                                       | ___ Type of parking lot surface.   |
| ___ Location of curb cuts.  | ___ Location of curbs.   |
| ___ Location of access easements serving the site.                    | ___ Location & type of significant existing vegetation.  |
| ___ Location of driveways opposite the site.                          | ___ Location & type of significant existing water courses.   |
| ___ Location of driveways within 100 feet on either side of the site. | ___ Location & type of significant existing water bodies.  |
| ___ Driveway width, curb radii and deceleration lane.                 | ___ Location & type of significant existing county or city drains & manmade surface drainage ways.   |
| ___ Location and size of all water lines.                             | ___ Location of 100 year floodplains.  |
| ___ Location and size of sanitary sewer lines.                        | ___ Location of existing wetlands.   |
| ___ Location and size of storm drainage lines.                        | ___ Vegetation which is to be retained on the site must be illustrated.  |
| ___ Location of fire hydrants.  | ___ Zoning on adjacent properties.   |
| ___ Location of catch basins.   | ___ Location & specifications for any existing or proposed above or below ground storage facilities for any chemicals, salts, flammable materials, or hazardous materials. |

Project: \_\_\_\_\_

Location: \_\_\_\_\_

Date: \_\_\_\_\_

Project Prepared By: \_\_\_\_\_

## **UTILITY LOCATIONS WITHIN STREET RIGHTS-OF-WAY**

The utilities listed below shall be constructed in the designated location within street rights-of-way for new construction unless existing utility locations preclude conformance to the standard locations.

Sanitary Sewers - centerline of the street.

Storm Sewers - 10 to 13 feet from the centerline of the right-of-way, but not in the vehicular wheel path.

Water Mains - 23 feet from the centerline of the right-of-way.

Gas Mains - in dedicated frontage easement.

Other Utilities - as approved by the Municipality.

## **EASEMENTS AND RIGHTS-OF-WAY**

The developer normally will have to provide the City with onsite and/or offsite easements and rights-of-way. If the developer desires municipal utility service and the City is to operate and maintain the proposed municipal utilities, easements, and/or appropriate sized rights-of-way will have to be provided to the City. The easements and rights-of-way may be on the developer's site or off the developer's site.

Where offsite easements are required, it is the responsibility of the developer to secure all easements for streets and utilities in the name of the Municipality. All easements required within the development shall be granted by the developer. The City shall draft the easement with the developer providing the necessary legal descriptions. Upon securing the easements, the developer shall also provide a deed of grant conveying all ownership interest in the public improvements to the City. Easements and deeds of grant shall be transferred to the Municipality prior to the acceptance of the project.

## **TRANSFER OF OWNERSHIP**

The developer owns, is responsible, and is liable for the municipal utilities constructed on their site until ownership is transferred to the City. This includes times when temporary service is being provided to the site. The developer is responsible for MISS DIG staking until ownership is transferred.

At a minimum, the following must be provided to the City prior to transfer of ownership:

1. Municipal utilities and streets constructed per these standards, with approved exceptions.
2. Record drawings acceptable to the City.
3. Release of lien from contractor and subcontractor.
4. Easements signed and recorded with the county.

The developer is responsible for the costs associated with these items. Upon their completion, ownership shall be transferred to the City through a deed of grant.

## ADMINISTRATIVE PROCEDURES AND FEES

### GENERAL

All correspondence, verbal requests, submission of drawings, and related information exchanges shall be directed to the City Manager or his or her designee at City Hall during normal business hours or by mail. Appropriate distribution of information to staff members, drawings, etc., shall be made by the City. This applies to information received from developers for the municipal engineer and information from the municipal engineer for the developer. The intent of this section is to make the City the point-of-contact with the developer and to maintain, in the City offices, a copy of all correspondence and related information for City use.

### FEES

The developer is directed to reference the “Zoning Ordinance Fee Schedule.” Developers shall complete the applicable forms for the City of Ionia/Township - Utility Site Plan Review Application/Checklist and provide payment in the appropriate amount to the City to have the municipal utility drawings or the site plan reviewed. **If an application form and payment are not provided, the reviews and approvals for the project may not be performed.** An example of the City of Ionia/Township - Utility Site Plan Review Application/Checklist is provided on Pages 5 through 9 of this document. The City may require the developer to enter into a Development Agreement, Act 425 Agreement or other agreement to accommodate the proposed development.

The City expects the developer to reimburse it for legal, engineering, and other professional fees associated with a development. Upon request by the developer, the City shall provide an estimate of construction engineering and inspection charges at the time of street and utility plan approval. Please note that these charges are often directly related to the time required for the developer’s contractor to perform the construction. The estimated amount shall be deposited with the City by the developer prior to construction. The City may request the developer to increase the amount deposited during the construction if issues occur which increase the amount of construction engineering and inspection required to complete the development.

The developer is also responsible to cover the cost of independent testing associated with the development so the City may verify that proper construction techniques and materials are used. The City engineer may coordinate the testing and request reimbursement if the developer does not coordinate the testing. In either manner, the cost of the testing shall be borne by the developer.



CHAPTER 2  
GENERAL CONSTRUCTION REQUIREMENTS

## **CHAPTER 2 - GENERAL CONSTRUCTION REQUIREMENTS**

### **GENERAL CONSTRUCTION SPECIFICATIONS**

#### **INSURANCE**

The developer shall furnish a Municipality's Protective Policy for the City affording limits of not less than \$1,000,000 per occurrence for personal injury liability and property liability with an aggregate of \$2,000,000 or those minimum limits as required by the Municipality, whichever is greater. In addition, the developer shall provide XCU coverage against loss due to perils of explosion, collapse, and underground hazards. These limits are minimum values, and increased insurance coverage may be requested depending upon the nature of the development.

In the policies to be issued, the named insured shall include the Municipality and the municipal engineer. The original policy shall be given to the Municipality with a certificate copy to be given to the municipal engineer. The policy shall also provide that it shall not be cancelled unless the Municipality and the municipal engineer have been given 30 days advance written notice of cancellation.

The developer shall not commence work or allow any contractor or subcontractor to commence work under this contract until the insurance requirement referenced above has been complied with and approved by the Municipality.

#### **BONDS AND OTHER SURETY GUARANTEES**

The developer shall post a performance bond for all work to be completed in the development. Other bonds may be requested by the City depending on the nature of the development and how the construction contracts are being administered. All bonds, surety guarantees, escrow accounts, etc., shall be in effect for a period of one year after final acceptance of all construction by the Municipality.

#### **HOLD HARMLESS AGREEMENT**

The developer shall indemnify and hold harmless the Municipality, its officers, agents, and employees, and all additional named insured's, for and from all claims, demands, payments, suits, actions, recoveries, and judgments of every kind and description brought or recovered against any or all of them for, or on account of, any injuries to or debt of any person, or any other loss or damage to persons or property by reason of the performance of the work of the project, and for any liability or obligation imposed directly or indirectly upon the Municipality or any of the additional named insured's by reason of any law of the State or of the United States now existing or which shall hereafter be enacted, imposing any liability or obligation or providing for compensation to any person or persons on account of, or arising from the death or injuries, to any municipal employee or employee of the developer, or any of its agents, contractors, or subcontractors.

The developer shall pay, settle, compromise, and procure the discharge of any and all such claims, and all such losses, damages, expenses, liabilities, and obligations, and shall defend at his own cost and expense, any and all claims, demands, suits, and actions made or brought against the Municipality, its officers, agents, or employees, and all additional named insured's for or upon any such claim. In case the developer shall fail, neglect, or refuse to comply with any of the provisions of this paragraph, the Municipality, its officers, agents, or employees, or any additional named insured may at its option, but without obligation to do so, in order to protect itself and any additional named insured from liability, defend such claim, demand, suits or actions, and pay, settle, compromise, or procure the discharge thereof, in which case the developer shall repay the Municipality including the attorneys fees paid, suffered or incurred by the Municipality, its officers, agents, or employees, or such additional named insured. Nothing in this paragraph shall be construed to apply whenever the damages arising out of bodily injury to persons or damage to property are caused by or resulted from sole negligence of any promisee or indemnity hereunder, its agents, or employees.

### **SUNDAYS AND NIGHT WORK**

The contractor may prosecute work during the hours of daylight, defined as 7 a.m. through 6 p.m. No work will be permitted at night, on Sundays, or on holidays unless specifically authorized or directed by the City or municipal engineer.

### **COMPLIANCE WITH LAW**

The developer shall give all notices required by, and comply with all applicable laws, ordinances, and codes of the local, state, and federal governments. All disconnections and demolition shall comply with all applicable ordinances and codes, including all written waivers. Before beginning the work, the contractor shall examine the drawings and technical specifications for compliance with applicable ordinances and codes, and shall immediately report any discrepancy to the Municipality. Should the contractor fail to observe the foregoing provisions and do work at variance with any applicable ordinances or codes including any written waivers (notwithstanding the fact that such methods are in compliance with the technical specifications), the contractor shall correct the methods of doing such work without cost to the Municipality.

### **ORAL AGREEMENTS**

No oral order, objection, claim, or notice by any party shall affect or modify any of the requirements of the Municipal Standards or other related ordinances and regulations.

### **SUPERINTENDENCE**

The developer shall give his personal superintendence to the work, or have a competent foreman or superintendent, satisfactory to the municipal engineer and the City, on the work site at all times.

## **DRAWINGS AND SPECIFICATIONS**

The contractor shall keep on the work site a copy of the drawings and specifications.

### **SHOP DRAWINGS**

After checking and verifying all field measurements, the developer shall submit to the municipal engineer, for approval, five copies (or at the municipal engineer's option, one reproducible copy) of all shop drawings, which shall have been checked and approved by the developer. The developer shall be responsible for their submission at the proper time so as to prevent delays and delivery of materials. A minimum of ten work days shall be allowed for checking and processing shop drawings.

The data indicated on the shop drawings shall be complete with respect to the dimensions, design criteria, materials of construction, and the like, to enable the municipal engineer to review the information as required. All details shall clearly indicate the relations of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the drawings before being submitted for approval.

All submissions shall be referenced properly to clearly indicate the locations, service, and function of each particular item. At the time of each submission, the developer shall, in writing on such drawings, call the municipal engineer's attention to any deviation that the shop drawing may have from the requirements of the contract documents and Municipal Standards. The municipal engineer will check such shop drawings with reasonable promptness, but this checking and approval shall be only for conformance with the design concept of the project and for compliance with the information given in the contract documents and Municipal Standards. The approval of shop drawings shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory.

Approval of such drawings will not relieve the developer of the responsibility for any error which may exist. The developer shall be responsible for the dimensions and design of adequate connections and details, and satisfactory construction. The developer shall make any corrections required by the municipal engineer and return the required number of corrected copies of shop drawings. The approval of a separate item, as such, will not indicate approval of the assembly in which the item functions.

No work requiring a shop drawing shall proceed until the submission has been approved by the municipal engineer. The municipal engineer's approval of shop drawings shall not relieve the developer from his responsibility for any deviation from the requirements of the contract documents and Municipal Standards, unless the developer has, in writing on such drawings, called the municipal engineer's attention to such deviation at the time of submission and the municipal engineer has given written approval to the specific deviation, nor shall it relieve the developer from errors or omissions in the shop drawings.

## **SAFETY**

The developer and contractor shall comply with, and be responsible for, knowledge of all current, applicable requirements of all Federal and State of Michigan Occupational Health and Safety regulations during construction of the proposed development.

## **USE OF JOB SITE**

The contractor shall confine his equipment, apparatus, the storage of materials, and operations of his workmen to limits indicated by law, ordinances, permits or directions of the Municipality, and shall not encumber the premises with his materials.

## **PROTECTION OF WORK**

The contractor shall continuously maintain adequate protection of all his work from damage and shall protect the Municipality's and adjacent properties from damage and/or injury arising in connection with his construction and the developer shall be responsible for all damage and/or injury caused by or arising out of his operations.

## **CONSTRUCTION OBSERVATION**

The Municipality and its representative shall have access to observe the work wherever it is in preparation or progress at all times. The developer shall provide proper facilities for access and for observation. Such observation shall not relieve the developer from any obligation to furnish materials and perform the work strictly in accordance with the approved specifications. The Municipality shall have the right to reject materials and workmanship which are defective or require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Municipality. Should it be considered necessary or advisable by the Municipality, at any time before final acceptance of the entire work, to make an examination of work already completed, by removing or tearing out same, the developer shall, on request, promptly furnish all necessary facilities, labor, and materials. If the work is found to be defective in any material respect, due to the fault of the developer or his contractors, the developer shall pay all costs associated with the examination and of satisfactory reconstruction. The developer shall cooperate with the Municipality and furnish such

assistance as may be required in order to facilitate inspection and for the purpose of laying out principal reference lines or points. Any work which, during its progress and before its final acceptance, becomes damaged from any cause, the work shall be removed and replaced by good satisfactory work at the developer's expense.

#### **BOUNDARY MARKER REPLACEMENT**

The developer shall have replaced by a professional surveyor, at the developer's own expense, all section corners, property corners, or boundary markers of any type or material that may be damaged or destroyed during construction of the development.

#### **RELEASE OF LIEN**

The developer shall provide a Release of Lien from the contractor upon completion of each phase of construction prior to the City accepting the municipal utilities or streets. The release of lien shall state that the contractor and all subcontractors have been paid and will not lien the project for payment of services performed. It is the developer's responsibility to provide the release of lien to the City in a timely manner.

## CHAPTER 3

### STANDARDS FOR UTILITY CONSTRUCTION WITHIN EXISTING STREET RIGHTS-OF-WAY

## **CHAPTER 3 - STANDARDS FOR UTILITY CONSTRUCTION WITHIN EXISTING STREET RIGHTS-OF-WAY**

### **GENERAL**

This utility standard covers all water main, sanitary sewer, storm sewer, natural gas, telephone, cable television, fiber optic lines or other utilities public or private, constructed by private persons or corporations in an existing municipal street right-of-way. No work shall be performed in City streets without notifying the City. The City will provide information on who has jurisdiction over the street(s) where the construction is proposed. The City reserves the right to request that performance bonds be posted to cover the cost of restoring the surface to its original condition.

All work shall be carried on in a neat and satisfactory manner and interference with flow of traffic shall be kept to a minimum. No street may be closed without prior permission from the authority having jurisdiction. The contractor shall be responsible for providing, installing, and maintaining traffic control signs, lights, and barricades as required by the current version of the Michigan Manual of Uniform Traffic Control Devices. If determined necessary by the authority having jurisdiction, a detour plan with appropriate control devices and a signing plan shall be provided. When given permission to close a street, the contractor is responsible to contact Ionia County Central Dispatch at (616) 527-0400.

The contractor shall notify the Municipality and MISS DIG (800-482-7171) at least 72 hours prior to commencing construction operations, unless the situation warrants immediate action. Unless otherwise specified, all work shall conform to applicable provisions of the MDOT 2003 Standard Specifications for Highway Construction or the latest version thereof.

Where applicable, construction drawings shall be submitted to the Municipality for approval a minimum of 30 days in advance of the proposed initiation of construction operations. When projects include water main extensions or sanitary sewer line extensions, construction shall not begin until MDEQ permits are obtained. A preconstruction meeting shall be held approximately 10 days prior to the start of construction.

### **CONSTRUCTION OPERATIONS**

In general, construction operations shall be in accordance with the applicable sections of these Municipal Standards. Upon completion of construction operations paved surfaces (bituminous or concrete) and the ground surface shall be restored in a manner similar to its original condition. The City will make the judgment on the adequacy of the restoration. It is recommended that pavement restoration be discussed with the City prior to performing the construction to avoid misunderstandings relative to the requirements.



## **PAVEMENT CROSSINGS**

Unless otherwise specified, where a utility line crosses the entire width of a permanent pavement, the contractor will be required to bore, bore and jack, or tunnel in accordance with the requirements of MDOT. If open cutting of the permanent pavement is allowed by the City, the pavement shall be saw cut prior to excavation, and backfilled and compacted in accordance with the requirements of MDOT and these standards.

## **PAVEMENT REPLACEMENT**

Pavement shall be replaced upon completion of construction operations weather permitting. Pavement replacement materials shall be of the same material and thickness as the existing pavement. During freezing weather, cold patch shall be used until permanent pavement can be replaced. The utility, private persons, or corporations shall be responsible for maintaining the cold patch until the permanent pavement can be replaced.

## **SIDEWALK AND DRIVEWAY APPROACHES**

Damage to sidewalks and driveway approaches shall be repaired or replaced with in-kind materials of similar quality and thickness. Repairs or replacement shall be done to the satisfaction of the City.

CHAPTER 4  
DIGITAL DATA SUBMISSION STANDARDS

## **CHAPTER 4 - DIGITAL DATA SUBMISSION STANDARDS**

### **SCOPE**

These standards establish the minimum requirements for the submission of digital design drawings to the City.

### **OBJECTIVE**

The City maintains digital mapping in a Geographic Information System (GIS) using ESRI ArcGIS software. In an effort to incorporate record drawings into the existing City mapping system, the following criteria are requested in the submission of digital data.

### **COORDINATE SYSTEM**

The City mapping system is in the Michigan State Plane Coordinate System - South Zone, North American Datum 1983, International Feet. The vertical datum is North American Vertical Datum 1988. This is the preferred system in which to provide digital drawings.

If it is not possible to meet this standard, all plats and site plans must reference at least two section corners to allow for geo-referencing transformation of the data.

Digital data must be mapped to scale.

### **DATA FORMAT**

In addition to submittal materials otherwise stated in the Municipal Standards, digital mapping files must be delivered in all of the following formats:

1. AutoCAD drawing file (.DWG) for complete project drawings.
2. Individual .DWG files representing utilities. ESRI ArcView shape files may be submitted in lieu of .DWG.
3. Individual .DWG files representing parcels and street right-of-way. ESRI ArcView shape files may be submitted in lieu of .DWG.
4. Adobe Acrobat image file (.PDF) of complete project drawings.

Digital files must be submitted on one of the following media:

1. CDROM
2. .ZIP (zip file) via E-mail

## DATA LAYERING

A complete list of drawing layer name descriptions must be delivered with the digital files. The metadata may be provided as an ASCII text file (.TXT), a Microsoft Word document (.DOC), or in World Wide Web Consortium (.XML) documents.

Individual layers must exist for the following features included in the drawings:

1. Site boundary
2. Parcel lot lines
3. Section corners - note if the point is surveyed or collected with Global Positioning System (GPS)
4. Parcel dimensions
5. Attached condominium footprints
6. Apartment, commercial, and industrial building footprints
7. Road right-of-way
8. Road names
9. Utility pipes - individual layer for each utility type (water main, sanitary sewer, storm sewer, etc.) and diameter
10. Utility labels - individual layer for each utility size and material
11. Utility structures - individual layer for each utility type and structure type
12. Detention ponds

CHAPTER 5  
STANDARDS OF DESIGN - STREETS AND MUNICIPAL UTILITIES

## **CHAPTER 5 - STANDARDS OF DESIGN - STREETS AND MUNICIPAL UTILITIES**

### **STANDARDS OF DESIGN - STREETS**

#### **SCOPE**

These standards establish the minimum requirements for the design of both public and private streets and roadways in the City.

#### **DRAWINGS AND SPECIFICATIONS**

1. The drawings and specifications shall be prepared by a professional engineer registered in the State.
2. Drawings shall consist of a cover sheet indicating a location map and site drawing of the proposed project, drawing and profile sheets covering all the proposed street and roadway construction, and a standard detail sheet. Drawing sheet size shall be 24 by 36 inches. Minimum drawing scale shall be 1 inch = 50 feet horizontally and 1 inch = 5 feet vertically. Where a different scale is proposed, the vertical scale shall be exaggerated 10 times the horizontal scale.
3. Drawings shall be developed using AutoCAD software; exceptions may be granted by the City.
4. Elevations shall be based upon NAVD 88 datum. Elevations based upon assumed datum will not be approved.
5. Drawing profiles shall indicate existing and proposed ground levels, NAVD 88 datum, and stationing.
6. Six sets of drawings and specifications shall be submitted by the developer to the City for preliminary approval. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design. Modifications required to meet the municipal standards, if any, will be noted on two sets with one such set returned to the developer for final corrections within 30 days of receipt.
7. Twelve sets of final drawings and specifications shall be submitted by the developer to the City for approval. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design.
8. The developer shall be responsible for securing all State and local construction permits required for street and roadway construction. The City will review and sign permits as necessary. Permits shall be obtained prior to beginning construction.

9. Six sets of record drawings, one set of reproducible record drawing tracings, on Mylar or polyester film, and one disk in current AutoCAD format, shall be submitted to the City upon completion of the construction. Record drawings shall be provided to the Utilities Department at 720 Wells Street, Ionia, Michigan 48846.

## **SUBSURFACE SOIL CONDITIONS**

The developer shall provide sufficient soil borings, at a minimum of one every 500 feet, and other information to accurately describe the prevailing soil conditions under proposed streets and roadways. The minimum soil boring depth shall be 10 feet below the plan road grade, unless unstable soil conditions are encountered. If such conditions are found, the boring depth shall be extended until stable soil is encountered.

## **RIGHTS-OF-WAY**

The minimum width of street rights-of-way shall be 66 feet for local streets and 80 feet for arterial or section line streets. Cul-de-sacs shall have 120-foot diameter rights-of-way. The rights-of-way for roundabouts will be dependent upon the size of the roundabout and shall be approved by the City and must be large enough to facilitate truck and emergency vehicle turning movements.

## **UTILITY LOCATIONS WITHIN STREET RIGHTS-OF-WAY**

Utility locations shall conform to the requirements outlined in Chapter 1 of these standards.

## **SIDEWALK**

Concrete sidewalks shall be 5 feet wide and shall be located 1 foot inside of the right-of-way line on both sides of the street, if applicable. At all intersections of sidewalks and curb and gutter, appropriate pedestrian ramps shall be constructed. Unless otherwise approved, the ramps shall be MDOT Type 1. The Type 1 ramp includes a "warning strip."

The maximum allowable sidewalk grade shall be 7% and the minimum allowable grade shall be 0.50%. Sidewalks shall project 1 inch above finished grade. In cut sections, the maximum sidewalk elevation shall be 1 foot above the street centerline elevation. In fill sections, the sidewalk elevation shall be no lower than 0.5 feet below the street centerline elevation. Sidewalk shall have a cross slope of 1/4 inch per foot toward the street in cut sections and toward the property line in fill sections. Sidewalks shall be 4 inches thick except across residential driveways, which shall be 6 inches thick, and across commercial driveways, which shall be 10 inches thick unless otherwise approved by the municipal engineer.

## **DRIVEWAY APPROACHES**

All driveway approaches between the curb and gutter and sidewalk shall be paved with concrete. Concrete driveway approaches for residential sections shall be 6 inches thick and 10 inches for commercial approaches. The maximum grade on driveway approaches shall be 10%. The width of the driveway curb cut shall conform to the standard detailed in Appendix 1 - Typical Curb Breaks.

## **CURB AND GUTTER**

### **DEVELOPMENT ACCESS REQUIREMENTS, DEAD END STREETS, AND CUL-DE-SACS**

Developments with over 75 living units shall have a minimum of two streets that connect into the City's street or township streets. Large developments may be required to have additional access points as determined by the City.

Dead end streets shall not exceed 800 feet in length. Cul-de-sac's shall be provided on dead end streets to allow turning movements for trucks, emergency vehicles, and snow removal. Cul-de-sacs shall have an outer curb radius of 50 feet. Cul-de-sacs shall normally have a center with a concrete roll curb. The center island may be landscaped but shall not be vegetated with plantings that require maintenance.

Temporary cul-de-sacs must be provided on all dead end streets created by a phased development. Temporary cul-de-sacs must be paved and drainage provided in an acceptable manner to the City unless maintenance is to be performed by a neighborhood or homeowner's association.

## **ROUNABOUTS**

Roundabouts may be permitted by the City in intersections where three or more streets converge. Roundabouts shall be of sufficient size to allow truck turning movements to occur without having rear tires top or go over the curb. Roundabouts shall be designed to a standard acceptable to the City and municipal engineer.

## **STREET DESIGN CRITERIA**

All streets and roadways shall include concrete curb and gutter; bituminous curb will not be allowed. On local streets, the minimum street width shall be 31 feet back to back of curb. Concrete curb and gutter width on major streets shall conform to the "Uniform Criteria for Major Streets" as adopted by MDOT and the City's Master Plan. At all intersections, the minimum curb radius shall be 25 feet, unless otherwise approved. Concrete curb and gutter shall conform to MDOT F-4 with longitudinal bars or to a roll curb section approved by the City.



The minimum longitudinal grade on any street with curb and gutter shall be 0.50 foot per 100 feet (0.5%). The maximum longitudinal grade on any street shall be 5 feet per 100 feet (5%) unless City approval is provided. In general, the length of a vertical curve shall be determined by the design speed, per American Association of State Highway and Transportation Officials' (AASHTO's) *A Policy on Geometric Design of Highways and Roads, 2004 edition*, unless otherwise dictated by site topography. In general, all intersections of streets or roadways shall be made perpendicular to each other. However, intersections ranging from 75 degrees to 90 degrees from perpendicular may be approved.

Streets shall normally be constructed with a crown in the center of the street. Transverse grades shall normally be 2% from the centerline of the street to the edge of the curb pan. Inverted crowns are not allowed on City streets. Additional information concerning street geometrics, right-of-way widths, block lengths, and other relevant requirements are available from the City.

Edge drains will be required on all streets unless waived by the City based on soil conditions. Edge drains shall normally be placed along the curb lines and connected to the storm sewer prior to the catch basins.

Subbase for all local and major streets shall consist of 12 inches of MDOT Class II sand.

Pavement design for local streets shall consist of 8 inches of compacted MDOT 4G Aggregate Base and 440 pounds per square yard of MDOT 13A or approved equal bituminous material constructed in 2 lifts; 2-1/2 inches or 275 pounds (lbs)/square yard (syd) leveling course and 1-1/2 inches or 165 lbs/syd top course. Pavement design for major streets shall reflect the increased traffic volume and higher axle loads and shall be subject to approval by the Municipality.

Bituminous material shall be delivered in quad axle trucks. Large flowboys are prohibited on City streets. Any damage to City streets from delivery of bituminous materials shall be repaired to the City's satisfaction by the contractor.

## RESTORATION ADJACENT TO STREETS

A mulch blanket shall be utilized from the back of curb to a minimum distance of 4 feet from the curb. Mulch blankets may also be required adjacent to driveways or in other areas required by the City. All other areas within the rights-of-way may be restored with seed and mulch per MDOT requirements for roadside seeding.

## STREET SIGNING AND STRIPING

All street projects within the City shall include new street name and traffic signing. Street signing shall be consistent with signing throughout the City. Traffic signing shall be in accordance with the current

version of the Michigan Manual of Uniform Traffic Control Devices. If street parking is prohibited, no parking signs shall be placed as approved by the City.

All streets shall be striped with cross walks and stop bars. Striping for centerlines and parking will be required on major streets and other streets as requested by the City.

## **STANDARDS OF DESIGN - SANITARY SEWERS**

### **SCOPE**

These standards establish the minimum requirements for the design of sanitary sewers in the City.

### **DRAWINGS AND SPECIFICATIONS**

1. The drawings and specifications shall be prepared by a professional engineer registered in the State.
2. Drawings shall consist of a cover sheet indicating a location map and site plan of the proposed project, drawing and profile sheets covering all the proposed sanitary sewer construction, and a standard detail sheet. Drawing sheet size shall be 24 inches by 36 inches. Minimum drawing scale shall be 1 inch = 50 feet horizontally and 1 inch = 5 feet vertically. Where a different scale is proposed, the vertical scale shall be exaggerated 10 times the horizontal scale.
3. Drawings shall be developed using AutoCAD software; exceptions may be granted by the City.
4. Elevations shall be based upon NAVD 88 datum. Elevations based upon an assumed datum will not be approved.
5. Drawing profiles shall indicate existing and proposed ground levels, NAVD 88 elevations, and stationing.
6. Six sets of drawings and specifications shall be submitted by the developer to the City for preliminary review and approval. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design. Modifications required to meet the municipal standards, if any, will be noted on two sets, with one such set returned to the developer for final corrections within 30 days of receipt. Preliminary drawings may have to be resubmitted if numerous corrections are noted.
7. Twelve sets of final drawings and specifications shall be submitted by the developer to the City for obtaining permits and construction after they are approved. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design and shall include a completed MDEQ Part 41, Act 451 Permit Application.

8. The City will secure the sanitary sewer construction permit from the MDEQ. The developer shall be responsible for securing all other permits required for the sanitary sewer construction and prior to being provided sanitary sewer service. All permits must be obtained before construction begins.
9. Six sets of record drawings, one set of reproducible record drawing tracings, on Mylar or polyester film and one disk in AutoCAD format shall be submitted to the City upon completion of the utility construction. The location of all tees, manholes, and the intersection of the service lateral and the respective property line shall be witnessed from at least two permanent topographic features. Record drawings shall be provided to the Utilities Department at 720 Wells Street, Ionia, Michigan 48846.
10. The developer is the owner, responsible and liable, for the all sanitary sewer until it is accepted by the City. The City will not accept the sanitary sewer until all grants of deed, easements, and record drawings are provided to the City. The developer must coordinate all MISS DIGG and other requests for locating the sanitary sewer due to construction or other activities until it is accepted by the City.

## **ILLEGAL CONNECTIONS**

The connections of footing drains, roof drains, sump pump discharge, or yard drains to the sanitary sewer are strictly prohibited.

## **INVERTED SIPHONS**

The use of inverted siphons will not be approved unless specific conditions warrant their use.

## **LOCATION**

The location of the sanitary sewer within the street right-of-way shall be on the centerline of the street.

## **SUBSURFACE SOIL CONDITIONS**

The developer shall provide sufficient soil borings along the sanitary sewer route to accurately describe the prevailing soil conditions. The borings shall be constructed to a depth of 5 feet below the proposed invert elevation of the sanitary sewer.

## **TRENCH BACKFILL AND LOADING DESIGN**

Sanitary sewers shall be backfilled with MDOT Class II sand or City approved equal. All sanitary sewers shall be designed so as to resist all trench backfill and construction load or anticipated superimposed loadings utilizing a factor of safety of 2.0 of the pipe's resistance to failure.

## **SANITARY SEWER DESIGN**

The City sanitary sewers are normally designed using polyvinyl chloride (PVC) pipe (see specifications). Other materials may be approved if their use is warranted.

Sanitary sewers shall be designed to maintain a minimum velocity of 2 feet per second; maximum velocity shall not exceed 10 feet per second. Suggested minimum grades for various size sanitary sewers are listed below:

6-inch (lateral)	1.00%
8-inch	0.40%
10-inch	0.28%
12-inch	0.22%
15-inch	0.15%
18-inch	0.12%
24-inch	0.10%

## **MINIMUM DIAMETER**

The minimum diameter of collection sewers shall be 8 inches; the minimum diameter of the service lateral shall be 6 inches. The sanitary sewer size shall be determined by the area to be served. The City may desire to increase the size of certain sewers, in which case the City may pay for the difference in sewer pipe and manhole material costs over and above the size required for the service area.

## **MANHOLES**

Sanitary sewer manholes shall be constructed at all changes in grade, size, and alignment of the sanitary sewer. The maximum run between manholes shall be 400 feet. Manholes shall be precast concrete with rubber "O" ring at joints; block or brick sanitary manholes will not be approved. Pipe openings shall be cast in the precast section or cored in the finished wall. Manhole pipe connections shall be furnished with an integrally cast seal system, Kor-N-Seal or equal.

Sanitary manholes shall have an integral concrete manhole bottom. A drop pipe shall be constructed for all sewers entering a manhole at a height of 24 inches or greater above the proposed manhole invert. The minimum inside diameter of a sanitary sewer manhole for sewers through 21 inches in diameter shall be 48 inches. For sanitary sewers 24 inches to 36 inches in diameter, the minimum inside diameter of the sanitary manholes shall be 60 inches. Depending on the number of pipes, the size of the pipes, and the elevation of the pipes, larger manholes may be required by the City. A minimum of three rows and a maximum of six rows of concrete adjusting bricks or concrete rings shall be constructed on top of

the precast cone section. The interior and exterior of the adjusting bricks or rings shall receive a 0.50-inch coat of plaster. Manholes shall be provided with approved manhole steps.

The standard sanitary manhole casting shall have a 24-inch clear opening. Refer to Table of Standard Materials (pages 47 and 48) for the standard manhole casting.

## **SERVICE LATERALS**

Service laterals shall be a minimum of 6-inch diameter and connected to the collection sewer shall with a wye or other City approved connection. Where sanitary sewers are deeper than 12-foot-6-inch-diameter risers shall be constructed such that the service lateral is 11 feet below finished grade at the property line. In addition, the developer shall be required to furnish a map to the City indicating the precise location of all sanitary sewer laterals at the property line intersection. The location should be witnessed from two recoverable reference points. The service lateral shall be constructed to the property line of all lots and marked in accordance with the sanitary sewer standard of construction included herein. Each residential unit shall have a separate sanitary sewer service lateral whenever there is separate ownership or rental of the living unit.

For commercial or industrial connections, a minimum 4-foot-diameter sampling manhole shall be constructed at the property line on the service lateral. Drawings submitted for approval shall note the elevation of the service lateral at the building foundation line, as well as the invert elevation of the lateral at the collection sewer. Minimum cover over the service lateral shall be 4 feet. For service laterals of extended length, manholes shall be constructed approximately 5 feet outside the building structure and at all changes in direction, materials, or pipe size. As an alternative, cleanouts may be constructed at 50-foot intervals, however, their use is discouraged and will not be allowed on service laterals over 150 feet in length.

## **SEDIMENT/GREASE TRAP**

All commercial and industrial facilities (including, but not limited to, restaurants, strip malls, car washes, auto dealers, auto repair, correction facilities, etc.), that may discharge sediment or grease shall provide an external sediment/grease trap when deemed appropriate by the City. The sediment/grease trap shall be sized to handle peak flows and shall be provided with a surface access for maintenance. A schematic diagram of an example grease trap is provided in Appendix 9. A sampling manhole will normally still be required on the service lead downstream of the sediment/grease trap.

## **LIFT STATIONS**

The City requires that all areas that can be served by gravity sanitary sewers be provided this service. The use of sanitary sewage lift stations is discouraged due to the ongoing operation and maintenance cost associated with stations.

When necessary, sanitary sewage lift stations shall be a wet pit-dry pit arrangement with centrifugal pumps. The lift station structures shall be either steel shell, reinforced concrete section, or reinforced fiberglass structures, approved by the City

The lift station should, to the extent possible, be of the same type of pumping equipment and manufacturer as existing municipal lift stations. The lift stations shall be equipped with duplex pumps. All lift stations shall be equipped with a generator (emergency power), ventilation fan, sump pump, and fire extinguisher in addition to the pumps, compressors, valves, ejectors, and other associated components. Lift stations shall be equipped with a flow meter on the discharge with a recording chart. Lift stations shall be equipped with high and low level alarms, including visual (red light) and autodialed systems. The flow meter and alarm system shall be capable of communicating control information to the Ionia Wastewater Treatment Facility in a manner consistent with the City's Supervisory Control and Data Acquisition (SCADA) system. Lift station design shall conform to the guidelines contained in the Recommended Standards for Sewage Works, Great Lakes-Upper Mississippi River Board of State Sanitary Engineers (Ten-States Standards) unless otherwise noted or approved.

The lift station to the extent possible should be compatible with the surrounding development. This shall be achieved by providing appropriate structures for the emergency generator and landscaping. A paved driveway shall be included in the site design. Fencing will normally be required.

Lift station design shall be performed in conjunction with the municipal engineer and subject to the approval of the City.

## **FORCE MAIN**

Design calculations for a proposed sanitary force main size shall be submitted with the pump station design. Force main shall be constructed with 6 feet of cover. Sanitary force mains shall be constructed of ductile iron or high density polyethylene (HDPE) pipe, as approved by the City. Electrical continuity and polyethylene encasement shall be provided when required by the City. Piping for sanitary force main shall be restrained at all locations necessary to eliminate pipe movement stresses. Where restrained joint pipe is not feasible, thrust blocks may be used if approved by the City.

Air release and/or vacuum valves shall be provided at high points and other locations approved by the City. All air release valves shall be constructed in manholes. Refer to Appendix 8 for an Air Release Manhole Detail.

Upon completion of construction, all sanitary force main shall undergo pressure leakage tests, and deflection testing as necessary.

## **STANDARDS OF DESIGN - STORM SEWERS**

### **SCOPE**

These standards establish the minimum requirements for the design of storm sewers in the City.

### **DRAWINGS AND SPECIFICATION**

1. The drawings and specifications shall be prepared by a professional engineer registered in the State.
2. Drawings shall consist of a cover sheet indicating a location map and a site plan of the proposed project, drawing and profile sheets covering all the proposed storm sewer construction, and a standard detail sheet. Drawing sheet size shall be 24 inches by 36 inches. Minimum drawing scale shall be 1 inch = 50 feet horizontally and 1 inch = 5 feet vertically. Where a different scale is proposed, the vertical scale shall be exaggerated 10 times the horizontal scale.
3. Drawings shall be developed using AutoCAD software; exceptions may be granted by the City.
4. Elevations shall be based upon U.S. Geological Survey (U.S.G.S.) datum. Elevations based upon an assumed datum will not be approved.
5. Drawing profiles shall indicate existing and proposed ground levels, U.S.G.S. elevations, and stationing.
6. Six sets of drawings and specifications shall be submitted by the developer to the City for preliminary approval. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design. Modifications required to meet the municipal standards, if any, will be noted on two sets, with one such set returned to the developer for final corrections within 30 days of receipt.
7. Twelve sets of final drawings and specifications shall be submitted by the developer to the City for approval. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design.

8. The developer shall be responsible for securing all State and local construction permits for storm sewer construction.
9. Six sets of record drawings, one set of reproducible record drawing tracings, on Mylar or polyester film, and one disk in AutoCAD format, shall be submitted to the City upon completion of the utility construction. The location of all tees, manholes, and catch basins, shall be witnessed from at least two permanent topographic features. Record drawings shall be provided to the Utilities Department, 720 Wells Street, Ionia, Michigan 48846.

## **LOCATION**

The location of the storm sewer shall be within the street right-of-way 10 to 13 feet from the centerline of the right-of-way and not in the vehicle wheel path.

## **BEST MANAGEMENT PRACTICES**

The City requires the use of best management practices to control storm water runoff and soil erosion during construction and for the design of storm water facilities. Development drawings will be reviewed looking to incorporate best management practices whenever possible, and the developer will be required to revise the drawings accordingly.

## **STORM WATER DETENTION/RETENTION**

The City may require the construction of storm water detention/retention facilities. If required, the facilities shall meet the requirements of the standards of the Ionia County Drain Commissioner (ICDC).

## **TRENCH BACKFILL AND LOADING DESIGN**

Storm sewers shall be backfilled with MDOT Class II sand or City approved equal. All storm sewers shall be designed so as to resist all trench backfill and construction load or anticipated superimposed loadings utilizing a factor of safety of 2 of the pipe's resistance to failure.

## **STORM SEWER DESIGN**

All main line storm sewers and catch basin leads constructed in the City rights-of-way or when requested by the City shall be reinforced concrete pipe (RCP). Main line storm sewers and catch basin leads outside of the City rights-of-way may be constructed with MDOT-approved plastic storm sewer pipe, if approved by the City.



Storm sewers shall normally be designed per the requirements of the ICDC. Storm sewers which discharge to a county drain shall meet the requirements of the ICDC. All storm sewers shall be designed to provide a minimum velocity of 3 feet per second and a maximum velocity of 10 feet per second when the pipe is flowing full.

The minimum diameter for all storm sewers, including catch basin leads, shall be 12 inches. The City may desire to increase the size of certain sewers, in which case, the City may pay for the difference in sewer pipe and manhole structure material costs over and above the size required for the service area.

Where applicable, the 100-year floodplain limits and floodplain elevation shall be noted on the drawings.

## **MANHOLE**

Storm sewer manholes shall be constructed at all changes in grade, size, and alignment of the storm sewer. The maximum run between storm sewer manholes shall be 400 feet or 100 pipe diameters for sewers over 36 inches in diameter. Manholes shall be precast concrete and shall have integral concrete manhole bottoms, whenever possible. The minimum inside manhole diameter for storm sewers through 21 inches in diameter shall be 48 inches. For storm sewers from 24 inches to 36 inches in diameter, the minimum storm manhole diameter shall be 60 inches. For storm sewers 42 inches and larger, the "tee" manhole riser sections shall be used. Should a change in grade, size, or alignment of the pipe occur in a manhole where one or more of the sewers are 42 inches in diameter or larger, the manhole section shall have a minimum inside diameter of the largest pipe diameter plus 2 feet. Depending on the number of pipes, the size of the pipes, and the elevation of the pipes, larger manholes or vaults may be required by the City. A minimum of three rows and a maximum of six rows of concrete adjusting bricks or concrete rings shall be constructed on top of the precast cone section. Manholes shall be provided with approved manhole steps.

The standard storm manhole casting is provided in the Table of Standard Materials (page 49).

## **CATCH BASINS**

Storm sewer catch basins shall have a minimum inside diameter of 48 inches and shall provide a minimum sump depth of 36 inches below the lowest pipe invert elevation. Catch basins shall be precast concrete and shall have integral concrete bottom, whenever possible. A minimum of three rows and a maximum of six rows of concrete adjusting bricks or concrete rings shall be constructed on top of the precast cone section. Catch basins shall be constructed at all low points in the curb and gutter and shall also be located so as to limit storm water travel in the gutter section to a maximum distance of 250 feet. If necessary, multiple catch basins will be required in the low points to allow adequate drainage.

Catch basins shall not be located in driveway approaches.

## **STORM SEWER LEADS**

Storm sewer leads shall be installed for each lot or parcel, extending from the main line storm sewer to the property line. Leads shall be 6-inch SDR 35 pipe, connected to the main line storm sewer via a cored hole and Kor-N-Seal, or equivalent, boot. Storm sewer leads shall not be connected directly to a manhole.

## **STANDARDS OF DESIGN - WATER DISTRIBUTION SYSTEMS**

### **SCOPE**

These standards establish the minimum requirements for the design of water distribution systems in the City.

### **DRAWINGS AND SPECIFICATIONS**

1. The drawings and specifications shall be prepared by a professional engineer registered in the State.
2. Drawings shall consist of a cover sheet indicating a location map and site plan of the proposed project, drawing and profile sheets covering all the proposed water main construction, and a standard detail sheet. Drawing sheet size shall be 24 inches by 36 inches. Minimum drawing scale shall be 1 inch = 50 feet horizontally and 1 inch = 5 feet vertically. Where a different scale is proposed, the vertical scale shall be exaggerated 10 times the horizontal scale.
3. Drawings shall be developed using AutoCAD software; exceptions may be granted by the City.
4. Elevations shall be based upon NAVD 88 datum. Elevations based upon an assumed datum will not be approved.
5. Drawing profiles shall indicate existing and proposed ground levels, NAVD 88 elevations, and stationing.
6. Six sets of drawings and specifications shall be submitted by the developer to the City for preliminary approval. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design. Modifications required to meet the municipal standards, if any, will be noted on two sets, with one such set returned to the developer for final corrections within 30 days of receipt.
7. Twelve sets of final drawings and specifications shall be submitted by the developer to the City for approval. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design.

8. The City will secure the water main construction permit from the MDEQ. The developer shall be responsible for securing all other permits required for the water distribution system construction.
9. When a contractor's work is near or associated with the City's water supply system (wells, storage tanks, booster pump stations, etc.), the contractor shall provide the following information for all individuals working on the project: Full name, driver's license number, vehicle description, vehicle license plate number, and vehicle identification number. This information shall be provided to the City one week prior to beginning construction operations.
10. Six sets of record drawings, one set of reproducible record drawing tracings, on Mylar or polyester film, and one disk in AutoCAD format, shall be submitted to the City upon completion of the utility construction and prior to being provided water service. The location of all valves and curb shutoffs shall be witnessed from at least two permanent topographic features. Record drawings shall be provided to the Utilities Department, 720 Wells Street, Ionia, Michigan 48846.
11. The developer is the owner, responsible and liable, for the all water main until it is accepted by the City. The City will not accept the water main until all grants of deed, easements, and record drawings are provided to the City. The developer must coordinate all MISS DIG and other requests for locating the water main due to construction or other activities until it is accepted by the City.

## **LOCATION**

The location of the water main within the street right-of-way shall be 23 feet from the centerline of the right-of-way whenever possible. The location of water main through a commercial or industrial development shall be approved by the City. A water main placed in front of a commercial or industrial property shall extend across the full width (or length) of the property being developed along the road right-of-way. The location of the water main shall be chosen to allow for looping of the water distribution system. The water main location should provide the City with an easement width of 30 feet for operation and maintenance.

In no case shall a water main be constructed within 10 feet (measured horizontally) from a sanitary sewer or storm sewer. Water main shall also be located with an 18-inch vertical separation from sanitary sewers and storm sewers.

Fire hydrants shall be located a minimum of 5 feet behind a curb, whenever possible; exceptions must be approved by the City.

Water mains shall be constructed along the entire street frontage of commercial, industrial, and institutional to facilitate future extension of the distribution system. In residential developments

rights-of-way and/or easements shall be provided to allow future extension of the water distribution system.

### **MINIMUM SIZE**

The minimum size of water main shall be 8 inches in diameter. Water mains shall be sized within a development to meet maximum demand and meet fire flow requirements consistent with the Insurance Service Offices recommendations when the system has the capabilities to meet these requirements. The City may desire to increase the size of certain mains, in which case, the City may pay for the difference in water main and valve material costs over and above the size required for fire flow.

### **VALVES**

American Waterworks Association (AWWA) approved gate or butterfly valves shall be placed throughout the distribution system in accordance with the following regulations:

1. On straight runs, valve shall be spaced at maximum intervals of 500 feet.
2. At tees, a minimum of three valves are required.
3. At crosses, a minimum of four valves are required.
4. At the end of a dead end main, a valve and a minimum of two full lengths of water main, and a hydrant shall be constructed to facilitate future connections.
5. A valve shall be installed at the intersection of water mains and easement lines; the City intends to maintain water main within legal easements.

### **VALVE BOXES AND MANHOLES**

Valves shall be provided with adjustable screw type valve boxes (no deeper than 6 feet) for all valves up to 12-inch. For valves on water mains 12-inch and larger, valve manholes may be required in state highway rights-of-way, paved surfaces, berms, sidewalks, and any other location where re-excavation may be difficult as determined by the City. Refer to the Table of Standard Materials.

### **WATER MAINS**

Water mains shall be constructed of Class 52 ductile iron with a minimum cover of 6 feet. In general, water mains shall be designed in a network with sufficient looping to eliminate "dead end" runs. Continuity wedges shall be installed at each joint.

## HYDRANTS

The minimum size for fire hydrants shall be 5 inches in diameter and the hydrant shall have connections and special construction as noted in the Table of Standard Materials. Hydrants shall be spaced along the water main network such that all residential, commercial, and industrial establishments are within 300 feet of a hydrant (measured along the street right-of-way). The pumper connection shall face the street. Hydrants shall normally be placed a minimum of 5 feet behind the curb or edge of pavement. Hydrants shall be constructed at all dead-end mains to allow for flushing.

Hydrants shall be constructed from the main by use of a standard tee and gate valve; the use of Lucas tees will not be permitted. Hydrants shall be provided to maintain 6 feet of cover over the water main and permit the break away flange to be installed above grade at a height per the manufacturer's recommendations. This will normally require a 6-foot hydrant length. Hydrant extensions, if required, shall be provided at no additional cost to the City. Hydrant and valve shall be restrained using Meg-a-lugs whenever possible as indicated in the Ionia Standard Hydrant Assembly (Appendix 10). A concrete thrust block of sufficient area may be constructed to resist the thrust when necessary and as approved by the City. At the City's discretion, hydrants shall have plugged drains.

Threads on the connections shall be the City fire department standard. All hydrants shall be furnished with a 5-inch-diameter Harrington Integral Hydrant Storz, compatible with the fire hydrant.

Hydrants shall be placed in service whenever possible including during a construction project. When hydrants are not in service, red "out-of-service" tags shall be placed on the hydrant to warn public safety personnel of this condition.

## SERVICE CONNECTIONS

The size of water service connection shall be approved by the City. The City requires that compression fittings be utilized on service connections; refer to the Table of Standard Materials for the specific components the City allows on service connections. Flared or other fittings will not be allowed. Service connections and curb boxes will not be allowed in driveways, drive approaches, or sidewalks.

For single-family residential units where separate ownership exists (including condominiums) each living unit shall have its own service lead. Connection to the water main shall be made with a corporation stop with a minimum diameter of 1 inch. The service lead shall be type K annealed seamless copper water tubing with compression type fittings. The service lead shall be constructed to within 6 inches of the property line and shall be terminated with a curb valve and adjustable curb box no more than 6 feet deep. The open end shall be capped and protected during backfill operations. Each service connection shall be provided with a minimum of 6 feet of cover. Refer to the Table of Standard Materials for acceptable manufacturers and model numbers.

For multi-family residential (apartments), commercial, and industrial buildings, the developer shall be responsible to provide separate leads for fire protection and domestic service. The size of the leads shall be determined by the developer based on their specific demand conditions. It is the developer's responsibility to determine the water system's flow and pressure at the desired location on the system. The developer must coordinate with the City when performing flow tests to evaluate the pressure and flow for the development.

Due to the elevation change in the City, certain areas will have high water pressure. When water pressures exceed 75 pounds per square inch, or when desired by the property owner, a pressure-reducing valve shall be placed on the service lead. The type of pressure reducing valve must be approved by the City, but is the owner's responsibility to maintain. Pressure reducing valves shall be installed prior to the water meter.

## **WATER METERS**

All water use associated with the City's water system shall be metered. Each metered residential unit shall have its own service connection and shutoff valve, and shall be equipped with a shutoff before and after the yoke at owner's expense. Such shutoffs shall be within reasonable distance of the yoke to permit maintenance and repair of the meter. The City standard 0.625-inch by 0.75-inch meter and yoke is available through the City for an individual residential service. Larger meter types and sizes shall be approved by the City and the developer or business is responsible for installation and meter costs. Water meters must be installed in a horizontal position. All water meters installed must be compatible with the City's "radio read" system to record water consumption information. The meter and appurtenances shall remain the property of the City and shall be maintained by the City in accordance with the City Water Ordinance.

Residential developments (manufactured housing, subdivision, site condominiums, planned unit developments, etc.) shall provide "radio read" equipment with the water meter that is compatible with the City's water meters and meter reading system. The developer is responsible for the cost of meters and "radio read" equipment.

Multi-family residential, commercial, and industrial developments must have metering systems approved by the City. The developer shall install the meter and provide sufficient space for the City to access the meter for maintenance, removing and replacing the meter in the future. Based on the daily variation in water use at these types of developments, compound meters will normally be required. The City will purchase a meter(s) for the development that is compatible with the City's metering system and shall be reimbursed by the developer for the initial cost of the metering equipment. The City will own and be responsible for maintaining the meter after the initial installation.

## **BACKFLOW PREVENTERS**

Service connections to the City water system, if required, must install approved backflow preventers, per International Plumbing Code, Michigan Plumbing Code, and MDEQ cross connection requirements. Water service will not be activated until the backflow preventer installation has been certified by a licensed plumber and proper paper work is on file with the City's Department of Public Utilities.

Applications where a reduced pressure zone (RPZ) backflow prevention device will be required on the service lead, after the meter, include, but are not limited to, the following:

1. Yard irrigation system on supply to irrigation system (not an RPZ in this case, but an atmospheric vacuum breaker).
2. Fire protection sprinkler system downstream of Siamese fire connection.
3. Service to industrial or correctional facilities.
4. Fire protection systems, wet or chemical.
5. Boiler for generating hot water or steam that is chemically treated for corrosion protection is required to have an RPZ.

All backflow prevention devices connected to the City's water system shall be tested and certified as working properly (refer to example certification on following page). A copy of the test certification shall be provided to the City prior to receiving continual water service.

Backflow preventers in high hazard locations must be tested annually. All other backflow preventers must be tested every five years.

## **TEMPORARY WATER SERVICE DURING CONSTRUCTION**

Developers and/or their contractors frequently request to have temporary water service during construction. After appropriate pressure and bacteriological testing has occurred, the City may allow temporary use of water for the ongoing development. The developer must contact the City Department of Public Utilities to make this arrangement for the temporary connection, meter, and payment. A deposit will be required for the temporary service based on meter size.

## **WATER MAIN TESTING**

The City's testing procedures are outlined in the water main specification in the next section of the Municipal Standards. The City's required water main testing procedures exceed the minimum standards outlined by AWWA. Since the City's water main testing requirements are slightly different than the minimum standards, contractors are encouraged to review the City's testing procedures. City personnel are available to review the procedure with the contractor, if necessary.

## CROSS CONNECTION CONTROL BACKFLOW PREVENTION DEVICES

Owner:			Telephone:		
Address:		City:	Zip:		
RPBP Location:					
Make:	Model:	Size:	Serial No.		
Testers State Certification No.:					
Company Name:					
	Check Value No. 1	Check Value No. 2	Pressure Differential Across No. 1 Check	Differential Pressure Relief Valve	
Test Before Repair	Leaked ( ) Closed Tight ( )	Leaked ( ) Closed Tight ( )	( ) p.s.i.	Opened at ( ) p.s.i. Reduced Pressure	Date:
Describe Repairs					Date:
Materials Used					
Final Test	Closed Tight ( )	Closed Tight ( )	( ) p.s.i.	Opened at ( ) p.s.i. Reduced Pressure	Date:
Comments:					
Pass: _____ Fail: _____					
Testers Signature:				Date:	



## **STANDARDS OF DESIGN - SITE DEVELOPMENT AND GRADING**

### **SCOPE**

These standards establish the minimum requirements for the design of site grading.

### **DRAWINGS AND SPECIFICATIONS**

1. The drawings and specifications shall be prepared by a professional engineer registered in the State.
2. Drawings shall consist of a cover sheet indicating a location map and site plan of the proposed project, a drawing sheet indicating the street and lot drainage, and a standard detail sheet. Drawing sheet size shall be 24 inches by 36 inches. Minimum drawing scale for residential developments shall be 1 inch = 50 feet horizontally and 1 inch = 5 feet vertically. Commercial and industrial developments may use a reasonable scale not greater than 1 inch = 100 feet unless approved by the City. Where a different scale is proposed, the vertical scale shall be exaggerated 10 times the horizontal scale.
3. Drawings shall be developed using AutoCAD software; exceptions may be granted by the City.
4. Elevations shall be based upon NAVD 88 datum. Elevations based upon an assumed datum will not be approved.
5. The site drawing for street and lot layout shall indicate both existing and proposed contours at a 1-foot contour interval. Individual lot drainage patterns shall be indicated on the drawing.
6. Six sets of drawings and specifications shall be submitted by the developer to the City for preliminary approval. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design. Modifications required to meet the municipal standards, if any, will be noted on two sets, with one such set returned to the developer for final corrections within 30 days of receipt.
7. Twelve sets of final drawings and specifications shall be submitted by the developer to the City for approval. All drawings and specifications submitted for approval shall be sealed by the registered engineer in charge of design.

### **STANDARDS FOR DESIGN - GRADING**

Site grading shall be designed to allow for drainage of storm water away from residential or commercial buildings. Grades shall be such as to minimize earth settlement problems, avoid concentrating runoff onto adjacent properties, prevent creation of water pockets or pools of standing water, and to minimize erosion. The grading design shall incorporate natural drainage courses where possible.

In areas where natural drainage is not present, surface (ditches) or subsurface (storm sewers) drainage shall be provided for collection and disposal of storm runoff. It is the intent of these regulations that the grading design minimizes the need for banks, retaining walls, or terracing.

Minimum grade away from structures shall be 2%. On slopes of 3.5 horizontal to 1 vertical or greater, sod with pegs must be provided to minimize erosion. The maximum allowable slope shall be 4 horizontal to 1 vertical. Site grading shall conform to the applicable sections of the SESC plan. Where mulch is required, a mulch adhesive shall be used.

Grading drawings for parking lot and sidewalk construction shall conform to the requirements of the Americans with Disabilities Act and the Michigan Barrier Free codes.

## **LANDSCAPING AND OPEN AREAS**

The developer is required to provide landscaping and open areas per the requirements of the City's Master Plan and ordinances. The developer should submit a separate landscaping plan for the City's review and approval.

The developer is also required to identify ownership of open areas as part of the development. In the event that the ownership shall be through a property owners association, the City shall be provided with the legal basis for the ownership and have input relative to the Master Deed or other document relative to the maintenance and upkeep of the open area.

## TABLE OF STANDARD MATERIALS

### SANITARY/STORM SEWER SYSTEM

Sanitary Manhole Castings	EJIW 1040A
Storm Manhole Castings	EJIW 1040B
Storm Catch Basin Castings	
Curb Type	EJIW 7045
Ditch Type	EJIW 6508
Gutter Type	EJIW 7065
Alleys	EJIW 5105
Parking Lots	EJIW 1460, Type M

### WATER DISTRIBUTION SYSTEM

#### Valves

Gate	Clow open left
Valve Box	Tyler type, three piece (D) 5 1/4 inch
Tapping Valve	Clow, Stainless steel saddle w/cast flange residual valve

### SERVICES

Service Lead	Type K annealed seamless copper
Corporation Stop	A.Y. McDonald 4701Q ¾ inch – 2 inch
	Corporation sizes exceeding the maximum for three full threads shall use a service clamp
Service Clamp (Saddles)	Romac 202 - 14.38 x 2CC
Curb Valve or Stop	A.Y. McDonald 6104Q ¾ inch - 2 inch
Curb Box	Tyler 6500 95E
	2 inch - Tyler 6500 - enlarged base 144809
Union	A.Y. McDonald 4758Q ¾ inch - 2 inch
Pressure Reducing Valves	Contact plumber to determine need for pressure reducing valve. If a pressure reducing valve is required, the valve will be owned by the homeowner and shall be installed prior to the meter.

## VALVE MANHOLE CASTINGS

6-, 8-, and 10-inch Valves	EJIW 1040 A, marked "Water"
12-inch Valve and Larger	EJIW 1330, solid cover marked "Water"

## FIRE HYDRANTS

Type	EJIW 5-BR model 503, yellow
Hose Connection	Two - 2-1/2-inch hose connections, National Standard
Pumper Connection	4-inch Pumper Connection, C 1/2 Thread
	5 inch Harrington Integral Hydrant Storz (HIHS)
Nuts	1-1/2-inch Point OT Flat
	National Standard, 1-1/2-inch Pentagon
Open	Left
Hydrant Storz	Harrington Integral

CHAPTER 6  
TECHNICAL SPECIFICATIONS

## CHAPTER 6 - TECHNICAL SPECIFICATIONS

### TECHNICAL SPECIFICATIONS INDEX

Land development projects shall be constructed in accordance with the MDOT 2003 Standard Specifications for Construction and the following Special Provisions, as included herein.

#### SPECIAL PROVISIONS

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SPECIAL PROVISION  
FOR  
ENVIRONMENTAL PROTECTION

1 of 2

It is the responsibility of the contractor to take such measures as may be necessary and to comply with all federal, state, and local laws and regulations for the protection of the public health, safety, welfare, and environment in the performance of the work. The cost of such compliance represents a cost of doing business to be borne by the contractor.

The following are specific requirements with regard to environmental protection matters:

1. Control of Air Pollution/Dust Control: During the construction of any project, adequate dust control measures shall be maintained by the contractor so as not to cause detriment to the safety, health, welfare, or comfort of any person or cause damage to any property, residence, or business. If not shown as a pay item, dust control shall be at the contractor's expense.
2. Control of Water Pollution and Siltation: Construction operations shall be conducted in such a manner as to prevent damaging sedimentation of watercourses, streams, lakes, or wetlands, and in accordance with the Soil Erosion and Sedimentation Control Permit issued for this Project.
3. Control of Hazardous Materials: All hazardous materials, hazardous waste, toxic materials, or polluting materials shall be used, stored, and disposed of according to applicable federal, state, and local laws and regulations.
4. Noise Pollution: The contractor shall exercise judgment in the conduct of operations which by nature result in excessive noise. All such operations shall take place during reasonable daylight period, which are defined as 7 a.m. through 6 p.m. unless otherwise stated in the governing municipal ordinance, or authorized by the City.
5. Construction Debris: All construction debris shall be removed from the construction site(s) at regular intervals and disposed of at sanitary landfill(s) licensed by the MDEQ.
6. Housekeeping: The project work area shall be maintained in a neat and clean condition and all debris and waste materials shall be removed from work areas on a daily basis.

7. Hauling on Local Roads and Streets: The contractor is advised that the hauling of construction materials over local roads and streets must be with the approval of the respective county and municipal authorities having jurisdiction over the proposed hauling routes. All loads shall be within legal limits established by the local governing authorities. The contractor is responsible for preventing the tracking of material onto local roads and streets. If any material is tracked onto local roads or streets, it shall be removed. It shall be the contractor's responsibility to make arrangements with local authorities for hauling routes.



SPECIAL PROVISION  
FOR  
REMOVING PAVEMENT - MODIFIED

1 of 1

- A. Description: The Work of Removing Pavement - Modified shall consist of removing existing pavement in accordance with Section 204 of the 2003 Standard Specifications for Construction of the Michigan Department of Transportation. The existing pavement varies in thickness.
- B. Methods of Construction: The existing pavement shall be removed to sawed joints at abutting streets as indicated on the drawings. Existing utilities shall be protected during removal operations.

# SPECIAL PROVISION FOR SUBGRADE UNDERCUTTING, SPECIAL

1 of 3

## A. Description

This work consists of subgrade undercutting, including backfilling. This work shall be performed to replace material susceptible to frost heaving or differential frost action and unstable soil conditions, as determined by the municipal engineer. The backfill shall consist of a structural geogrid with 12 inches of 21AA dense graded aggregate. This work shall be performed in accordance with Section 205.03 of the Michigan Department of Transportation 2003 Standard Specifications for Construction, except as modified herein.

### 1. Definitions

The following defines terms used herein:

Structural geogrid - A structural geogrid formed by regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock, earth, and function as reinforcement.

### 2. Reference Documents

Geosynthetic Research Institute

GG1-87 Standard Test Method for Geogrid Rib Tensile Strength

GG2-87 Standard Test Method for Geogrid Junction Strength

## B. Materials

### 1. Structural Geogrid

Furnish Tensar structural geogrid reinforcement manufactured by Tensar Earth Technologies, Inc. of Morrow Georgia; or approved equal.

Geogrid reinforcement shall be BX1100 (Tensar SS1) or BX1120.

### 2. Backfill

Dense graded aggregate conforming to Class 21AA specification, MDOT 2003 Standard Specifications for Construction, Section 902.

### C. Methods of Construction

After the subgrade has been excavated to the approximate grade, the municipal engineer will promptly inspect the grade to determine if any subgrade undercutting is required and determine the limits of such undercutting. Subgrade undercutting shall be performed within the limits established by the municipal engineer, and the excavated material shall become the property of the contractor.

The subgrade shall be undercut a uniform 12 inches. The contractor shall backfill the undercut by placing a dense graded aggregate, 21AA on top of the structural geogrid.

#### 1. Geogrid Installation

The geogrid reinforcement shall be laid horizontally on the prepared subgrade. The geogrid shall be pulled taut, and anchored prior to backfill placement on the geogrid.

The geogrid reinforcement shall be overlapped a minimum of 12 inches at the longitudinal and transverse edges.

#### 2. Material Storage and Protection:

Geogrids shall be stored above -20 Degrees F (-29 Degrees C).

Prevent excessive mud, wet cement, epoxy, and like materials from coming into contact with, and affixing to, the geogrid material.

Rolled geogrid material may be laid flat or stood on end for storage.

#### 3. Reinforced Backfill Placement

Backfill shall be placed, spread, and compacted in such a manner that minimizes the development of slack in the geogrid.

Backfill shall be placed and compacted in accordance with Section 302 of MDOT 2003 Standard Specifications for Construction.

#### 4. General

Track construction equipment shall not be operated directly upon the geogrid reinforcement. A minimum fill thickness of 6 inches is required prior to operation of tracked vehicles over the geogrid. Tracked vehicles turning should be kept to a minimum to prevent tracks from displacing the fill and damaging the geogrid.

Rubber tire equipment may pass over the geogrid reinforcement at slow speeds, less than 10 MPH. Sudden braking and sharp turning shall be avoided.

SPECIAL PROVISION  
FOR  
CONCRETE DRIVEWAY, NONREINFORCED

1 of 1

A. Description

The work of Concrete Driveway, Non-reinforced shall consist of constructing concrete driveways and drive approaches, of the thickness specified in the drawings, in accordance with Sections 205 and 801 of the Michigan Department of Transportation 2003 Standard Specifications for Construction, except as modified herein.

B. Methods of Construction

The work shall consist of placing concrete on a 4-inch-thick compacted MDOT granular material Class II subbase, consolidating the concrete, and providing a broom or burlap finish. Water shall not be added to the concrete surface as an aid in finishing except when approved by the municipal engineer.

SPECIAL PROVISION  
FOR  
CONCRETE SIDEWALK

1 OF 1

A. Description

This work shall consist of constructing Portland cement concrete sidewalks on prepared base at locations shown on the drawings, in accordance with Section 203 of the 2003 Michigan Department of Transportation Standard Specifications for Construction, except as modified herein.

B. Construction Methods

Excavation shall be made to the required depth and width that will permit forming. A 4-inch-thick compacted MDOT granular material class II subbase shall be placed under the concrete sidewalk. Sand subbase layer shall be included with the concrete sidewalk.

SPECIAL PROVISION  
FOR  
BITUMINOUS APPLICATION ESTIMATE  
LOCAL STREETS

1 of 1

A. Description

1. The bituminous mixture (top course) - 13A shall have a yield of 165 pounds per square yard. Estimated thickness is 1-1/2 inches.
2. The bituminous mixture (leveling course) - 13A shall have a yield of 2,850 pounds per square yard. Estimated thickness is 2-1/2 inches.
3. The asphalt cement - mixture shall be performance grade 58-28 for bituminous mixes 13A.
4. The bituminous bond coat material shall be per the Michigan Department of Transportation 2003 Standard Specifications for Construction.

SPECIAL PROVISION  
FOR  
SLOPE RESTORATION

1 of 1

A. Description

This work shall consist of grading, top soiling, seeding, Class A fertilizing, and mulching as shown on the typical cross section in accordance with Section 816 of the Michigan Department of Transportation 2003 Standard Specifications for Construction and as directed by the municipal engineer.

B. Materials

All materials shall meet the requirements specified in Section 816.02 of the Michigan Department of Transportation 2003 Standard Specifications for Construction.

C. Construction Method

The contractor shall restore all areas as described in Subsections 816.03 of the Michigan Department of Transportation Standard Specifications for Construction. Materials shall be placed at rates described therein, or as directed by the municipal engineer.



SPECIAL PROVISION  
FOR  
SANITARY SEWER

1 of 8

A. Description

The work shall consist of furnishing all plant, labor, equipment, and materials in connection with installation of Sanitary Sewers.

B. Materials

1. Certification of Materials: When requested, the contractor shall furnish certification that all materials meet the requirements set forth in the drawings and specifications. The source of the certification shall be determined by the municipal engineer.
2. Pipe and Joints: All materials shall be new. Manufacturers' recommendations for storage, handling, and installation shall be strictly adhered to. Materials shall be of the type as listed herein meeting the specifications noted.

a. Pipe

1) Polyvinyl Chloride (PVC):

- a) For 6-inch- through 15-inch-diameter sanitary sewer, PVC pipe shall conform to ASTM D3033 or ASTM D3034. Minimum pipe wall thickness shall be SDR 35. All pipes shall have a "home" mark. Joints shall be of the elastomeric gasket push-on type conforming to ASTM D3212.

- b. Fittings: All pipe connections and pipe size and/or direction changes shall be made with standard manufactured fittings conforming to the following.

1) Polyvinyl Chloride (PVC) Fittings:

- a) For 6-inch- through 15-inch-diameter sanitary sewer, PVC fittings shall be full fittings conforming to ASTM D3033 or ASTM 3034 for pipe wall thickness of SDR 35.

c. Connections of Dissimilar Pipe Materials: Connections shall be made utilizing one of the following methods:

- 1) Standard Adapters: Shall be a manufacturer's standard adapter with joints conforming to the above specifications.
- 2) Couplings: Shall be an elastomeric coupling complete with 300 series stainless steel tension bands conforming to ASTM C425. Couplings shall be Clow Band-Seal Couplings, Fernco Flexible Couplings, or equal.

d.Changes in Pipe Sizes: Shall be made using standard smooth flow increasers or reducers.

e.Lubricants: All lubricants for the making of pipe joints shall strictly conform to the recommendations of the pipe manufacturer.

3. Sanitary Sewer Manholes: Sanitary sewer manholes shall be precast concrete conforming to Appendix 4 and the details on the drawings. Joints between the pipe and the manhole shall be as indicated on the drawings.
4. Chemical Grout: Chemical grout for sealing minor joint leaks shall be an U.S. Environmental Protection Agency approved type.
5. Marking: All pipe, fittings, and appurtenant items furnished to the job site shall be marked in accordance with the applicable specification. Any unmarked materials are subject to rejection by the municipal engineer.
6. Pipe Bedding and Backfill Materials: Shall conform to the MDOT Standard Plan R-83 series.

#### C. Methods of Construction

- 1) General: Handling, storage, installation, and the making of joints shall strictly follow the manufacturer's recommendations. Plastic and rubber materials affected by ultraviolet rays including all PVC products shall be protected from direct sunlight. Material handling during cold weather shall take into account increased brittleness of plastic materials. Pipe which is warped or bowed due to temperature variations such that the deviation from straightness is greater than 1 inch shall not be installed.

- 2) Grade and Alignment: All sewers shall be laid utilizing an "in-line" laser for vertical and horizontal control. Vertical and horizontal alignment of the invert shall, at any point, be within plus or minus 0.04 feet (1/2 inch) of plan elevation and line.
- 3) Cutting of Pipe: Full lengths of pipe shall be used whenever feasible. Cutting of pipe where required shall be done only using methods as recommended by the manufacturer, utilizing tools, and equipment as required to provide a neat, perpendicular cut without damage to the pipe or coatings. All burrs shall be removed. Spigot ends of cut pipe shall be beveled similar to factory beveling. If field cutting or coring of pipes exposes any bare metal surface, the surface shall be covered with an epoxy coating.
- 4) Laying of Sewer: Each pipe shall be inspected for possible defects before being placed in the trench. Joint surfaces shall be free of earth or frozen matter. All pipes shall be laid with bell ends upgrade to line and grade as called for on the drawings and each pipe as laid shall be checked by the contractor. Pipe shall be laid from the low end of sewer upgrade. The use of brick, lumps of clay, wood, etc., to bring the pipe to grade will not be permitted.
  - a) Joints: Shall be made in strict accordance with the manufacturer's recommendations utilizing the recommended lubricant. Wood blocks or other approved materials shall be used to protect the pipe and fitting ends from pry bars, chains, etc. with particular care taken with plastic materials. Pipe shall be pushed closed to the "home" position and if joints do not remain tightly closed, the pipes shall be replaced.
  - b) Final Line and Grade: After the pipe is laid, care in backfilling and other operations shall be taken so as not to disturb its line, grade, or joint. Misalignment shall be cause for rejection of the sewer.
- 5) Connections to Live Sewers: When connections are made with sewers carrying sewage or water, special care must be taken that no part of the work is built underwater; a flume or dam must be installed and pumping maintained, if necessary, and the new work kept dry until completed and any concrete or grout has set.
- 6) Service Laterals: Shall be installed in accordance with Appendix 6 and 7 to the property line or length as indicated on the construction drawings. The location of the service lateral shall be as indicated, or when serving an existing building, to the location designated by the building owner. Where an existing service lead is to be connected, the contractor shall locate the lead.

- a) **Marking:** The contractor shall mark the end of each service lateral with a 4- by 4-inch post of sufficient length to extend from the service lateral to 3 inches below grade, unless otherwise indicated on the drawings. The top of each 4- by 4-inch post shall have four 16-penny common nails driven into it for subsequent location with a magnetic locator.
  - b) **Record of Locations:** The contractor shall record and submit to the City and the municipal engineer, a location sketch of the service lateral fitting measured upstream from the nearest manhole and shall record the location of the terminus of the service lateral with a minimum of two witness measurements to permanent physical features, building corners, etc. Any services not readily located within one year after the date of the final payment due to inaccurate record drawing measurements shall be field located by the contractor at no expense to the City.
  - c) **Risers:** Where sanitary sewers are constructed deeper than 12 feet, service risers shall be constructed as shown in Appendix 7. Risers shall be constructed such that the service lateral is 11 feet deep at the property line. When main sanitary sewers are less than 12 feet deep, no riser is required and the lateral shall be constructed at a slope such that the service lead is 11 feet deep at the property line, if feasible. The 6-inch service laterals shall be constructed at a minimum slope of 0.60%. Lateral fittings shall be installed with the branch connection tilted up 45 degrees.
  - d) **Service Lateral Inspection:** All service lateral pipes shall be left with at least the top of the pipe exposed until inspected by the City or his representative and authorization for backfill given.
- 7) **Removal of Unsuitable Material:** Whenever any pipe section, fitting, or appurtenance is found to be unsuitable for installation due to specification non-conformance, poor workmanship, damage, or any other reason, it shall be removed from the construction site during that working day by the contractor. Any material not so removed shall be painted or otherwise marked by the municipal engineer to prevent its subsequent use.

8) Sanitary Sewer Testing: In general, the sanitary sewers shall be tested by applying an air pressure test described in the following paragraphs. Methods of testing and measurement other than specified herein shall be approved by the municipal engineer. The contractor shall be responsible for furnishing all equipment and labor for the air testing at no additional cost to the City. All testing shall be performed in the presence of the municipal engineer.

a) Air Testing: Is required to be performed on all sanitary sewers. The following described test procedure shall be used.

i) Equipment Required: Portable air compressor, standard air hose and connections, minimum of 50 feet of single and triple air hose, one single and one triple connection pneumatic sewer plug, one hand air pump, stopwatch, and one air gauge, range 0 to 30 psig graduated in tenths from 0 to 10 psig.

ii) Preliminary Requirements: After all sewer, lateral, and manhole construction and backfilling operations have been completed, the sewer shall be cleaned by the contractor as follows:

- Inflatable Balls: The contractor shall furnish an inflatable rubber ball of a size that will inflate to fit snugly into the pipe to be tested. The ball may, at the option of the contractor be used without a tag line or a rope may be fastened to the ball to enable the contractor to know and control its position at all times. The ball shall pass through the pipe with only the force of the water impelling it. All debris flushed out ahead of the ball shall be removed at the first manhole. In the event cemented or wedged debris or damaged pipe shall stop the ball, the contractor shall remove the obstruction.

- **Pneumatic Plug Test:** The pneumatic plugs shall pass the following qualifying test in the presence of the municipal engineer and contractor prior to the line testing. One length of sewer pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked; air shall be introduced into the pipe until the pipe pressure reaches 15 psig. The pneumatic plugs being checked shall hold against this pressure without bracing being needed, and without movement of the plugs out of the pipe. All pneumatic plugs shall pass the aforementioned qualifications before being used to test the actual installation.
- iii) **Test Procedures:** Immediately following the pipe cleaning described, low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4 psig greater than the average back pressure of any groundwater pressure, as determined by the municipal engineer, that may be over the pipe. At least two minutes shall be allowed for the air pressure to stabilize.
- **Acceptance:** The portion of the line being tested shall be accepted if the portion under the test meets or exceeds the requirements of ASTM C 828. This requirement shall be accomplished by performing the test as follows: The time required in minutes for the pressure to decrease from 3.5 to 2.5 psig greater than the average back pressure of any groundwater that may be over the pipe shall not be less than the time shown for the given diameters in the table following this paragraph. If the system does not meet the foregoing requirements, the contractor will be required to locate and repair the leaks at no extra cost to the City and repeat the tests until the allowable leakage is obtained.

Air Test Table					
ASTM C828					
Minimum Test Time For Various Pipe Sizes					
Pipe Size (inches)	Time per 100 feet		Pipe Size (inches)	Time per 100 feet	
	Minute	Seconds		Minute	Seconds
4	0.3	18	21	3.0	180
6	0.7	42	24	3.6	216
8	1.2	72	27	4.2	252
10	1.5	90	30	4.8	288
12	1.8	108	33	5.4	324
15	2.1	126	36	6.0	360
18	2.4	144	39	6.6	396
			42	7.3	438

NOTE: If the section of line to be tested includes more than one pipe size (i.e. lateral connections), calculate the test time for each size, and add the test times to arrive at the total test time for the section.

PVC Deflection Tests: The completed installation of PVC sewers shall at no point have out-of-round pipe deflections greater than 5%. Deflectometer or go/no-go gauging tests shall be performed prior to acceptance of sewers. The test shall be conducted after the final backfill has been in place at least 30 days.

- (c) TV Inspection: The City or his representative shall have the option of performing a TV inspection of any section of sewer for signs of structural damage, joint leaks, or infiltration. The costs of the inspection shall be paid by the City unless the inspection reveals faulty construction or materials wherein the costs shall be paid by the contractor.
- (d) Correction of Defective Work: Whenever any of the above tests or inspections indicate defective material or installation, the contractor shall repair and retest the section to the satisfaction of the municipal engineer at no cost to the City. The use of chemical grouts shall be limited to the repair of minor joint leaks and shall not be used without the specific

Written approval of the municipal engineer. Any pipe or fitting having structural damage shall be removed and replaced. Any PVC sewer with deflection in excess of the 5% limitation shall be re-excavated, inspected for structural damage, and then rebedded and backfilled, and retested.

10. Sewers Placed Inside Steel Casing Pipe: Sewers placed inside a steel casing pipe shall conform to alignment, grade, and inverts as indicated on the construction drawings to tolerances stated in this special provision. To facilitate placement and proper alignment of the sewer, the contractor shall install skids as detailed on the construction drawings. The height of the skids shall be varied as required to meet the proposed inverts and grade. The skids shall be spaced such that grout will freely flow beneath the inserted sewer pipe. Hold down devices shall be installed to prevent “floating” of the sewer during grouting operations. The contractor may propose an alternate method to place, align, and hold down the sewer, subject to the approval of the municipal engineer. After placement of the sewer, the annular space between the casing pipe and the inserted sewer shall be filled with grout. Prior to grouting of the annular space, the sewer must pass all acceptance testing and be approved by the municipal engineer. Grouting equipment shall be capable of placing grout at all locations required by the construction drawings. Bulkheads shall be constructed in the annular space to retain the grout and the grouting shall begin at the farthest downstream point and proceed upstream.



SPECIAL PROVISION  
FOR  
STORM SEWER

1 of 2

a. Description

This work shall consist of installing concrete storm sewer pipe and drainage structures of the required type and diameter, and shall include excavation and backfilling. This work shall be in accordance with Sections 402 and 403 of the 2003 Michigan Department of Transportation Specifications for Construction with the following modifications:

b. Materials

1. Concrete Pipe: Concrete sewer pipe shall be ASTM C76 and shall conform to the class designation indicated on the drawings or in the proposal. In the absence of class designation, Class III shall be required.
2. Joint Sealer: All concrete pipe joints shall be plain joint tongue and groove and shall be wrapped with a non-woven geofabric.
3. Storm Sewer Manholes: Storm sewer manholes shall be precast concrete conforming to Appendix 2 and the details on the drawings. Joints between the pipe and the manhole shall be as indicated on the drawings.
4. Catch Basins: Catch basins shall be precast concrete conforming to Appendix 3 and the details on the drawings. Joints between the pipe and the catch basin shall be as detailed on the drawings.
5. Concrete Lead Encasement: Grade P2 or S3.
6. Storm Lead: Unless otherwise indicated on drawings, all storm leads shall be 6-inch SDR 23.5 PVC pipe conforming to requirements of ASTM D3034. Connect to mainline storm sewer with Kor-N-Tee flexible connector manufactured by NPC.
7. Non-woven Geofabric: Used in wrapping storm joints shall weigh at least 3 ounces per square yard and be a minimum of 3 feet in width.

c. Methods of Construction

Construction shall conform to MDOT Sections 402 and 403 with the following modifications:

1. Connecting to Existing Pipe: When the joint of the pipe connecting to existing sewer or drainage structure lead does not match the existing pipe, the connecting joint shall be constructed in accordance with the Michigan Department of Transportation Section 401 requirements for extending concrete culverts.
2. Backfilling: Backfill for sewers shall be MDOT Granular Material Class II or with onsite granular material approved by the municipal engineer.
3. Surplus Earth Removal: Disposal of excavated materials shall be the responsibility of the contractor. The municipal engineer reserves the right to require that all or any part of the excavated material be hauled to such locations as may be designated. Such designated locations will not be more than one mile from the excavation site.
4. Concrete Lead Encasement: Concrete encasement for drainage structure leads shall be installed at various locations as directed by the municipal engineer.
5. Storm Sewer Lead: Core a hole in pipe consistent with Kor-N-Tee connector and storm service lateral diameter. Insert Kor-N-Tee assembly into pipe and expand into place. Insert service lateral into Kor-N-Tee until it “bottoms” into a positive stop in Kor-N-Tee. Tighten pipe clamp around service lateral to 60-inch pounds.

## SPECIAL PROVISIONS FOR WATER MAINS

1 of 7

a. Description

The work covered by this section of the specifications consists of furnishing all labor, equipment, and materials in connection with installation of water mains.

b. Materials

1. Detailed material lists and specifications for all materials furnished under this section of the specification shall be submitted to the municipal engineer for review.
2. Water main pipe shall be new and of the type as specified herein.

A. General Requirements

- (1) Material Selection: Unless specifically shown on the drawings or listed in the proposal to be a specific material, the contractor shall utilize ductile iron pipe material.
- (2) Single Material Requirement: Unless otherwise approved by the municipal engineer, a single material shall be used for all water mains in the Contract. If multiple pipe materials are permitted, the change in materials shall be accomplished at normal junctions such as valves or fittings.
- (3) Pipe Markings: All pipes delivered to the job site shall bear the marks required by the ANSI/AWWA specification.

B. Ductile Iron (D.I.): Shall conform to ANSI/AWWA C151/A21.51 and the following:

- (1) Class and Size: Unless otherwise indicated on the drawings, pipe wall thickness shall be a minimum pressure Class 52. Ductile iron may be used for 3-inch and larger diameter pipe.
- (2) Exterior Coating: Bituminous, 1 mil thick.
- (3) Lining: Standard thickness cement-mortar conforming to ANSI/AWWA C104/A21.4.
- (4) Polyethylene Encasement: ANSI/AWWA C105/A21.5.

2 of 7

- (5) Mechanical Joints and Push-on Joints: ANSI/AWWA C111/A21.11, bolts and nuts shall be high strength corrosion resistant alloy with hex head nuts.
- (6) Fittings: Shall conform to ANSI/AWWA C153/A21.53-88.
- (7) Electrical Continuity: Bronze wedges or continuity straps.

### 3. Valves

#### A. General Requirements

- (1) Working Pressure: 150pounds per square inch (psi) minimum.
- (2) Joints: Unless otherwise indicated on the drawings or valve schedule, mechanical joint conforming to ANSI/AWWA C111/A21.11. End flanges, if specified, shall be ANSI B16.1 Class 125.
- (3) Direction of Opening: Left.

#### B. Resilient Seated Gate Valves: Shall conform to ANSI/AWWA C509 and the following:

- (1) Body Construction: ASTM A126 Class B, cast iron.
- (2) Operator: Square nut, unless otherwise indicated on the drawings or the valve schedule.
- (3) Manufacturer: Refer to Table of Standard Materials.

### 4. Valve Boxes: Cast iron, Tyler type, three piece; cover shall be furnished marked "Water."

### 5. Hydrants: Shall conform to ANSI/AWWA C502 and the following:

- A. Type and Size: Breakaway traffic flange; 6-inch main valve seat.
- B. Connections: Two - 2-1/2 inch hose nozzles, National Standard and a 4-inch pumper connection; C 1/2 threads.
- C. Direction of Opening: Left.
- D. Operating Nut- 1-1/2 pentagon.
- E. Quick Connect: Provide 5-inch Harrington Intergrel Hydrant Storz quick connect for pumper nozzle.

- F. Manufacturer: Refer to Table of Standard Materials.
6. Service Lead, Corporation Stop, Curb Valve, Curb Box
- A. Service Lead Pipe: ASTM B88 type K annealed seamless copper water tube of the size indicated on the drawings. Fittings shall be compression type.
  - B. Corporation Stop: Refer to Table of Standard Materials.
  - C. Curb Valves: Refer to Table of Standard Materials.
  - D. Curb Box: Refer to Table of Standard Materials.
  - E. Union: Refer to Table of Standard Materials.
- c. Methods of Construction
1. Water Main Installation:
- A. General: Installation shall be in accordance with ANSI/AWWA C600 for ductile iron pipe.
  - B. Laying Pipe: Pipe shall be laid with the bell ends facing the direction of laying, unless otherwise directed or allowed by the municipal engineer.
  - C. Location: As indicated on the drawings. Maintain at least a 10-foot separation from any sewer, unless specifically indicated on the drawings.
  - D. Grade and Alignment: Provide cover of 6 feet, unless otherwise indicated on the drawings.
  - E. Wet Trench Laying: When the trench contains water, open ends of the pipe shall be closed by a watertight plug. This provision shall apply during at all times when construction is not in process (noon and overnight).
  - F. Pipe Bedding and Backfill: Shall be in accordance with the Trench Details indicated on MDOT Standard Plan R-83 Series, Utility Trenches.
  - G. Pipe Encasement: Ductile iron pipe, bedded in an area of aggressive soil such as peat, shall be encased in a polyethylene encasement.

- H. Electrical Continuity: Unless otherwise noted on the drawings, electrical continuity shall be provided for ductile iron pipe.
  - I. Locating Provisions: A suitable means for magnetically locating PVC water main shall be provided and approved by the municipal engineer in writing prior to construction.
  - J. Thrust Restraint: Shall be placed at all bends, dead ends, tees, reducers, hydrants and valves, as required, using mechanical restraints, Meg-a-Lugs, or approved equal whenever possible. In special cases, when approved by the City, a thrust block consisting of MDOT grade S2, poured-in-place concrete may be used in lieu of the mechanical restraint. Thrust blocks shall be designed according to the current edition of the Ductile Iron Pipe Research Association Thrust Restraint Design for Ductile Iron Pipe.
2. Valve Installation:
- A. AWWA approved gate or butterfly valves shall be placed throughout the distribution system in accordance with the details on the drawings.
  - B. Valves shall be provided with adjustable, Tyler type valve boxes for all valves up to 12-inch. For valves on water mains 12 inches or larger, valve manholes, if required, shall be placed in accordance with Appendix 12.
3. Hydrant Installation: In accordance with Appendix 10
- A. Hydrant Base: Hydrants shall be placed upon a poured-in-place or precast concrete base (MDOT grade S2, 4 inches thick) of at least 2 square feet, or as indicated on the drawings. Suitable solid stone or salvage slab may be used for the concrete base as approved by the municipal engineer. A pocket of crushed stone shall be placed around the bottom 18 inches of the hydrant barrel depth.
  - B. Depth of Bury: Hydrant leads shall have 6 feet minimum cover, including crossings through ditch sections.
  - C. Hydrant Drain Ports: Shall remain plugged unless otherwise indicated on the drawings.

D. Hydrant Thrust Restraint: Shall conform to paragraph c.1.J. of this specification.

4. Service Lead Installation: In accordance with Appendix 11:

A. General: Open cutting of existing hard surfaced pavement will not be allowed. Service leads may be bored, drilled or jacked; jetting of water or air will not be allowed. Under normal conditions, casings will not be required except where probable damage to the roadbed or the service lead exists. Service leads shall be installed to provide a depth of cover of 6 feet.

B. Installation without Casing: In stable soils, the diameter of the auger head shall not exceed the diameter of the service lead by more than 1 inch. Service lead pipe shall be pushed or pulled through after the hole has been augured. Pipe ends shall be examined after installation for damage. If damaged, the service pipe shall be replaced.

C. Installation with Casing: In unstable soils, as determined by the City, the combination of boring and jacking simultaneously shall be utilized providing the cutting edge of the auger does not advance ahead of the casing. Casing diameter shall not exceed the diameter of the service lead by more than 1 inch. Casing pipe may be removed at the contractor's option.

D. Boring Installation: Shall conform to the requirement of the local agency/utility.

E. Connection to Existing Services: Connections to existing water services with like material shall be made with standard couplings; connections of dissimilar materials shall be made with appropriate couplings complete with Nylon dielectric bushings.

d. Water Main Testing

1. Hydrostatic Testing Requirements:

A. General: Upon completion of installation of the water main and appurtenances, the contractor shall furnish all apparatus, materials, labor, and water required to perform the pressure tests in accordance with Section 4 - Hydrostatic Testing, ANSI/AWWA C600, and the following:

6 of 7

- B. Pre-Test Procedures: contractor shall open all valves, including hydrant auxiliary valves, and then completely fill the line with water with a special emphasis upon removing all air from the pipe, valves or hydrants. If necessary, the contractor shall install additional corporation stops at high points to allow the air to be expelled.
- C. Preliminary Test: A preliminary pressure test by the contractor shall be accomplished. Any leaks encountered shall be corrected and the test shall be rerun until results are satisfactory.
- D. Final Pressure and Leakage Test: Shall conform to ANSI/AWWA C600 - Hydrostatic Testing, in the presence of the municipal engineer, who shall receive 24 hours notice prior to testing. If it is necessary for the municipal engineer to observe more than one test on any section of mainline, the contractor shall be liable for the additional cost involved for observation of subsequent tests.
- E. Leak Repair: The contractor shall provide all labor and materials, etc. as required to repair leaks, or otherwise required to meet these tests. Any leakage over the allowable design calculations in AWWA C600 shall be repaired. Water damage resulting from flushing or testing procedures shall be the responsibility of the contractor.

5. Disinfection Requirements

- A. General: Procedures shall conform to ANSI/AWWA C651, and the following:
- B. Preliminary Flushing: After the pressure test and before disinfection, the contractor shall flush out the new pipe lines until the water runs clear. Each valved section of the newly laid pipe shall be flushed separately with potable water from the public supply.



- C. Disinfection: The contractor shall disinfect the new mains by flushing in approximate 1,000-foot intervals at a minimum velocity of 2.5 feet per second until water runs clear. Sufficient chlorine should be applied for a 25 ppm chlorine residual and allowed to remain in the water main for 24 hours. Samples shall be taken from corporation stops only or location approved by the City. Sampling from hydrants is not recommended. If mains dead end at hydrants with no adjacent valve, the contractor shall install an additional corporation stop for sampling. Water with chlorine residuals greater than 1 ppm must be disposed of in the sanitary sewer in a manner acceptable to the City.
- D. Bacteriological Water Samples: The contractor shall test chlorine residuals prior to each bacteriological sample and the chlorine residual must be at the normal level of chlorine in the system to allow bacteriological test to be performed. The contractor must wait a minimum of 24 hours after the chlorine is flushed before collecting the first bacteriological test sample. The contractor shall collect the water sample(s) on which bacteriological tests will be performed in the presence of the municipal engineer or authorized municipal employee and in conformance with ANSI/AWWA C651. The City will perform the bacteriological tests at their certified National Sanitation Foundation laboratory (No. 3370). If the contractor elects to have an independent certified laboratory perform the bacteriological tests, a duplicate set of samples shall be provided to the City. Two successive safe tests taken 24 hours apart are required; analysis shall be made by a State approved laboratory.
- E. Failing Tests: In the event of a failing test, flushing, disinfection, and testing as described above shall be repeated. The contractor shall be responsible for the tests and shall be liable for any costs associated with testing.

SPECIAL PROVISION  
FOR  
MAINTENANCE GRAVEL (LM)

1 of 1

- a. Description: This work consists of constructing an aggregate surface on a prepared grade, where directed by the municipal engineer, to maintain traffic during construction. Removal and disposal of the aggregate when no longer needed, is also included in this item of work. This work shall be in accordance with Section 306 of the Michigan Department of Transportation 2003 Standard Specifications for Construction except as modified by this special provision.
- b. Materials: Maintenance gravel shall be dense graded aggregate Class 22A or 23A. When approved by the municipal engineer, salvaged aggregate or bituminous material may be used in place of Class 22A or 23A. Salvaged material must come from this project and must be 2 inches or less in diameter.
- c. Construction: Maintenance gravel is to be placed at locations indicated on the drawings or indicated by the municipal engineer, to provide a flush transition to shoulders, driveways and other areas where traffic is to be maintained.

The aggregate surface shall be maintained in a smooth and firm condition until no longer needed for maintaining traffic. When construction operations progress to the point that the maintenance gravel is no longer needed, removal of maintenance gravel is to occur in the same workday as paving or aggregate surfacing of the removal area.

Maintenance gravel may be incorporated into the construction of shoulders or approaches at the direction of the municipal engineer. Otherwise, the contractor is responsible for removal and disposal of the material in accordance with the 2003 Standard Specifications for Construction.

# SPECIAL PROVISION FOR CONCRETE UTILITY MANHOLES

1 of 3

a. Scope

The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, and materials in connection with concrete utility manholes.

b. General

1. Requirements: All concrete utility manholes, including valve vaults, shall be installed in accordance with the details indicated on the drawings and these specifications.
2. Material Lists: The contractor shall submit detailed material lists to the municipal engineer for approval of all materials furnished under this specification.

c. Materials

1. Precast Sections:
  - A. Integral Base: Manholes shall consist of integral cast base and riser sections conforming to ASTM C478.
  - b. Pipe Connections: Pipes shall generally be flush with the interior manhole wall, but protruding no more than 2 inches. Manhole section joints shall be as noted in the appendices for the manhole type. All pipe openings shall be cast in the precast section or cored in the finished wall. Broken and patched connections will not be accepted.
2. Manhole Adjusting Rings: Shall be standard precast reinforced concrete rings with a minimum of 3 rows and a maximum of 6 rows. For all new projects, the manhole castings shall be set at the road base surface, with the final adjustment to be made at the time of construction of the final course of bituminous surfacing.

3. Manhole Steps: Shall be Co-Polymer Polypropylene Plastic manhole steps reinforced with 3/8-inch deformed reinforced bar. Manhole steps shall be of the press-fit type with serrated type tread and lugs. Steps shall not be cast in wall. Steps shall be spaced at 16 inches on center in a true vertical alignment unless indicated otherwise on the drawings.
4. Cast Iron Frames and Covers: Shall conform to the castings noted on the Table of Standard Materials.
5. Mortar and Grout: At the discretion of the City, the mortar and grout may be required to be hydrogen sulfide resistant.
6. Concrete: Concrete shall meet the requirements of MDOT grade S3.

d. Installation

Utility manholes shall be constructed of precast concrete sections including risers, grade rings, and precast tops of eccentric cone, or flat slab.

1. Utility Manhole: Precast bases shall be set on uniform bedding of 8 inches of compacted sand or existing granular material. When water is encountered in the trench, bases shall be set on a minimum of 12 inches of stone fill meeting MDOT 6A.
2. Precast Concrete Risers: Shall be set plumb and where manhole steps are provided, the risers shall be aligned to form a continuous ladder. Joints between manhole sections shall utilize rubber O-rings. Top sections shall be eccentric unless otherwise indicated on the drawings.
3. Castings: Shall be installed as specified below:
  - a. Storm Sewer Manholes and Catch Basins: Castings shall be set on precast concrete adjusting rings with a minimum of adjustment of 3 grade rings and a maximum of 6 grade rings. Casting and rings shall be set in mortar.
  - b. Casting Elevations: Where castings are to be flush with permanent pavements, the contractor shall adjust the frame to the proper grade. Where castings are on flat slab tops in non-paved areas, they shall extend approximately 1 inch above finish earth grade unless shown otherwise.

- c. Inside Finish: The inside surface of adjustment rings or bricks shall be tooled to give a smooth finish coat of mortar.
- 4. Flow Channels: Shall be constructed in manhole bottoms with mechanically mixed MDOT grade S2 concrete. Prior to placement of concrete, a bonding compound, Sealtight INTRALOK, Sika SIKABOND, ACRYL 60, or equal, herein shall be applied per manufacturers' recommendations to the manhole base. Flow channel depth shall not exceed half of the pipe diameter and concrete thickness shall be a minimum of 4 inches measured from the top of the base to the bottom of the flow channel. A minimum 0.1-foot drop between inlet and outlet pipe invert elevations shall be provided. Where the grade of sewer is continuous through the manhole, the contractor may lay the pipe through the manhole, fill around the pipe with concrete, and carefully break out or cut out the top of the sewer pipe.

# SPECIAL PROVISION FOR IMPORTED GRANULAR EMBANKMENT

1 of 1

a. Description

This work shall consist of importing granular material for embankment construction. This work shall be performed to construct the site grading to the proposed line and grades, in the event sufficient material is not available onsite.

b. Materials

Shall conform to MDOT Granular Material Class III.

c. Methods of Construction

Construction of embankment shall be performed in accordance with Section 205.03 of the Michigan Department of Transportation 2003 Standard Specifications for construction except as modified herein.

1. Material shall be placed and compacted in accordance with the controlled density method.
2. Importing of granular material for embankment construction shall be approved in writing by the municipal engineer prior to transporting of material to the site.

CHAPTER 7  
VARIANCE PROCEDURE

## CHAPTER 7 - VARIANCE PROCEDURE

The City of Ionia Municipal Standards provides documentation of the City's expectations for developers, contractors, businesses, and utility companies performing work in the City of Ionia. The City has tried to clarify common development and utility issues with these Municipal Standards. Every effort should be made to comply with these standards.

The City and municipal engineer review project plans for general conformance to these Municipal Standards and acceptable development practices. If the City identifies deviations from the Municipal Standards when project drawings are submitted for review, the City will require that the design be modified to comply with the standards. If the City discovers that the standards are not being complied with during construction and the variance procedure described below was not followed, the work not in compliance shall be reconstructed to meet the standards, regardless of whether the drawings were previously approved by the City.

The City understands that some projects may have special circumstances that do not fit the framework outlined in the standards and a variance may be appropriate. If a special circumstance exists where compliance with one or more of the standards is not practical, a written request for a variance from the Municipal Standards may be made. To request a variance from the Municipal Standards, the developer, contractor, business, or utility company shall provide the City with an explanation of the special circumstance and details and supporting documentation required to verify the necessity of the variance. Once the written request and complete supporting documentation are received by the City, the City will review and approve or deny the request within 45 days. If the submitted materials are found to be incomplete, the City may request that additional information be submitted. The 45-day review period will not begin until the City has all the documentation required to determine the necessity of the variance.



## APPENDICES

### STANDARD CONSTRUCTION DETAILS

MUNICIPAL STANDARDS

FOR THE

CITY OF IONIA

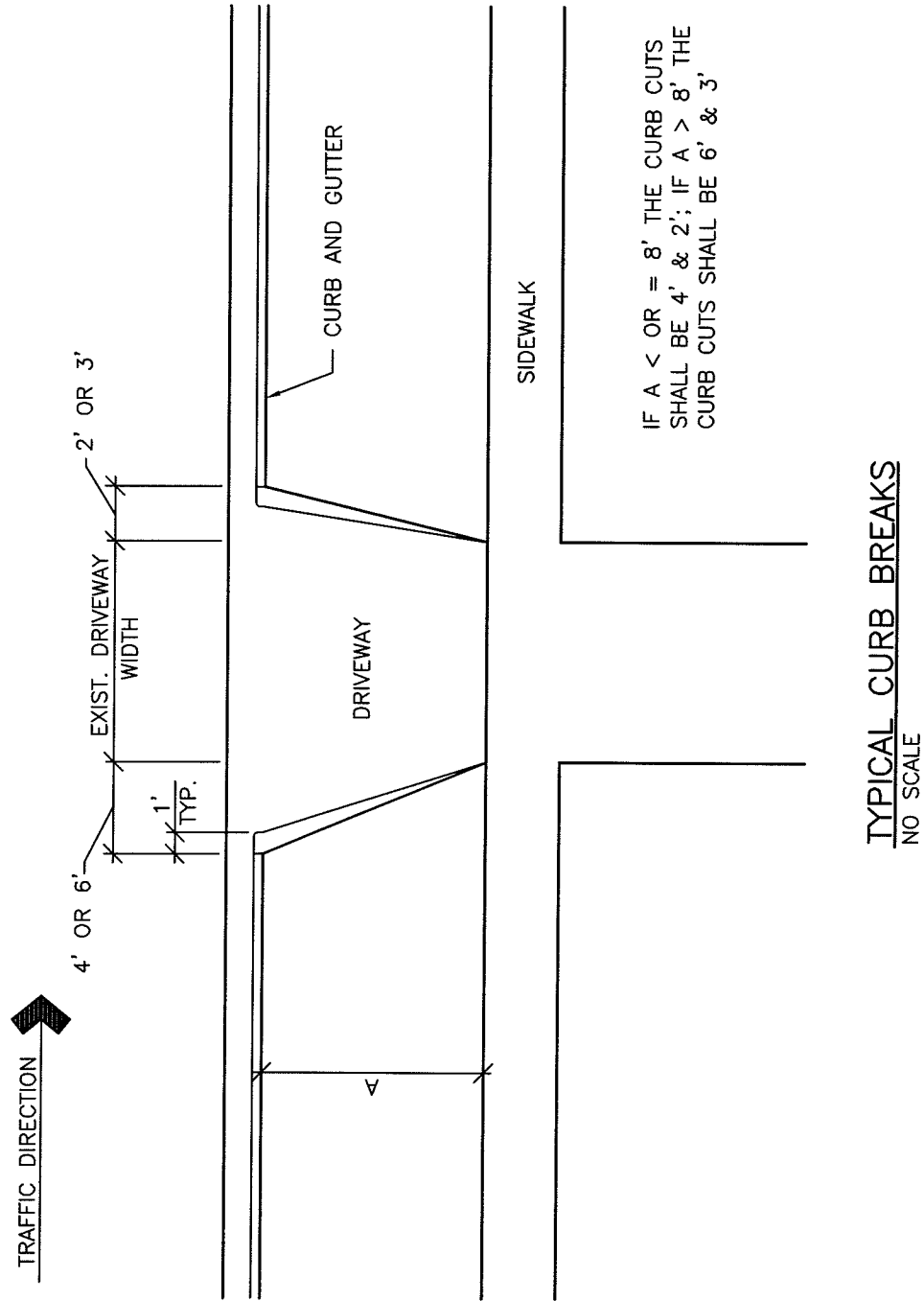
IONIA COUNTY, MICHIGAN

APPENDICES

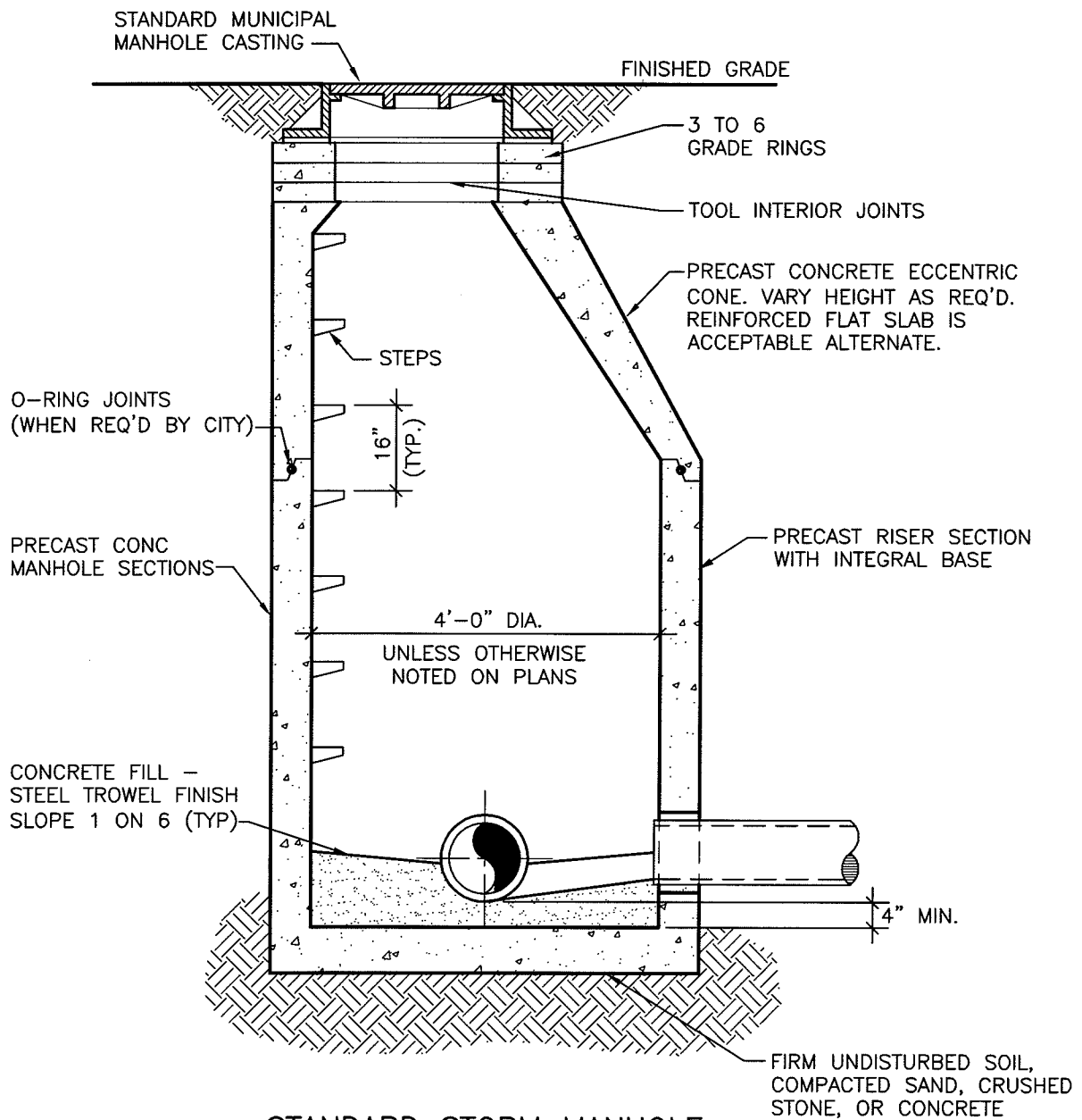
STANDARD CONSTRUCTION DETAILS

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Appendix 9	•	Air Release Manhole Detail
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Appendix 11	•	Water Service Connection Detail
Appendix 12	•	Valve Manhole Detail

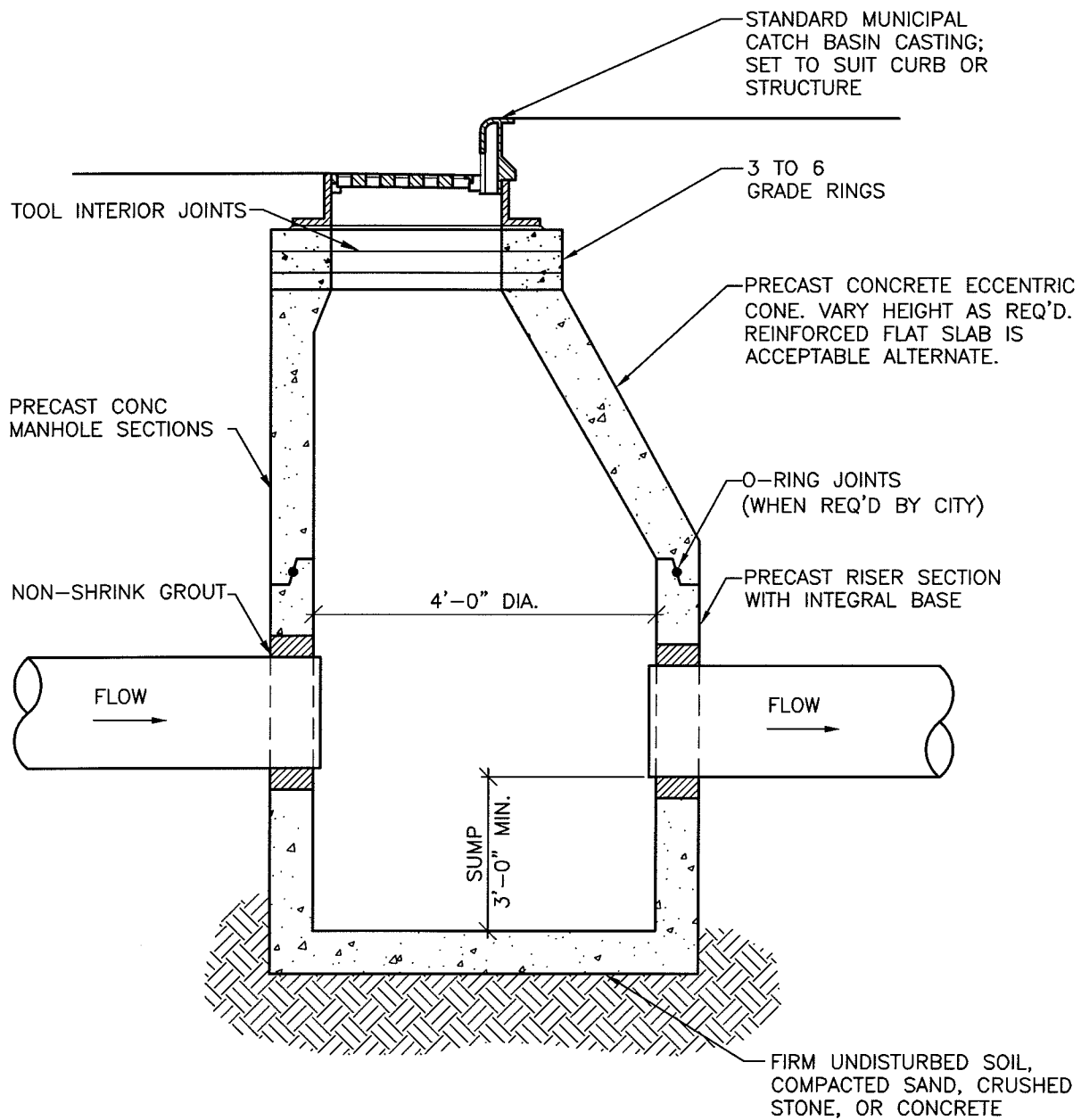


# Appendix 1



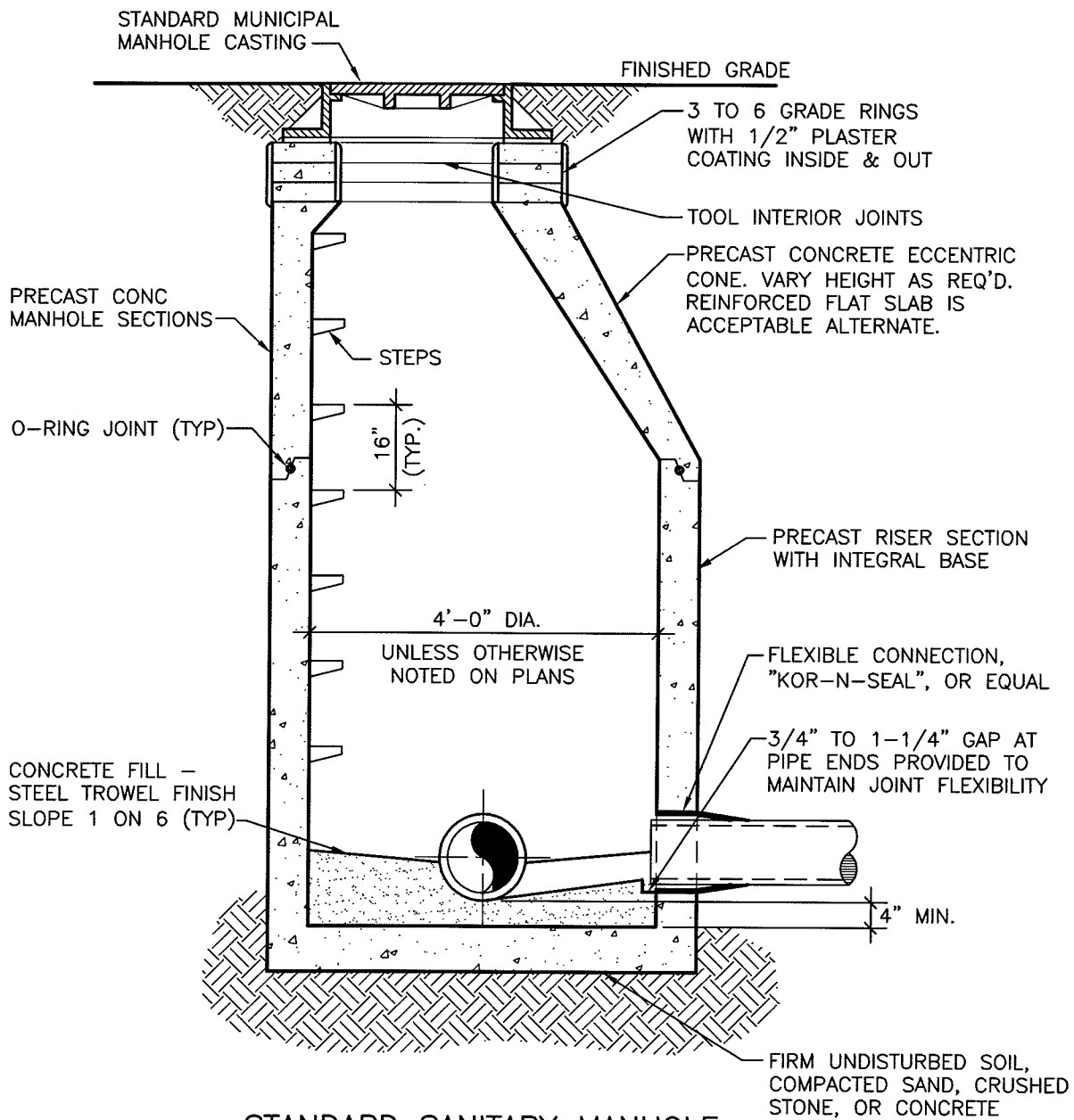
**STANDARD STORM MANHOLE**  
NO SCALE

## Appendix 2



STANDARD CATCH BASIN  
NO SCALE

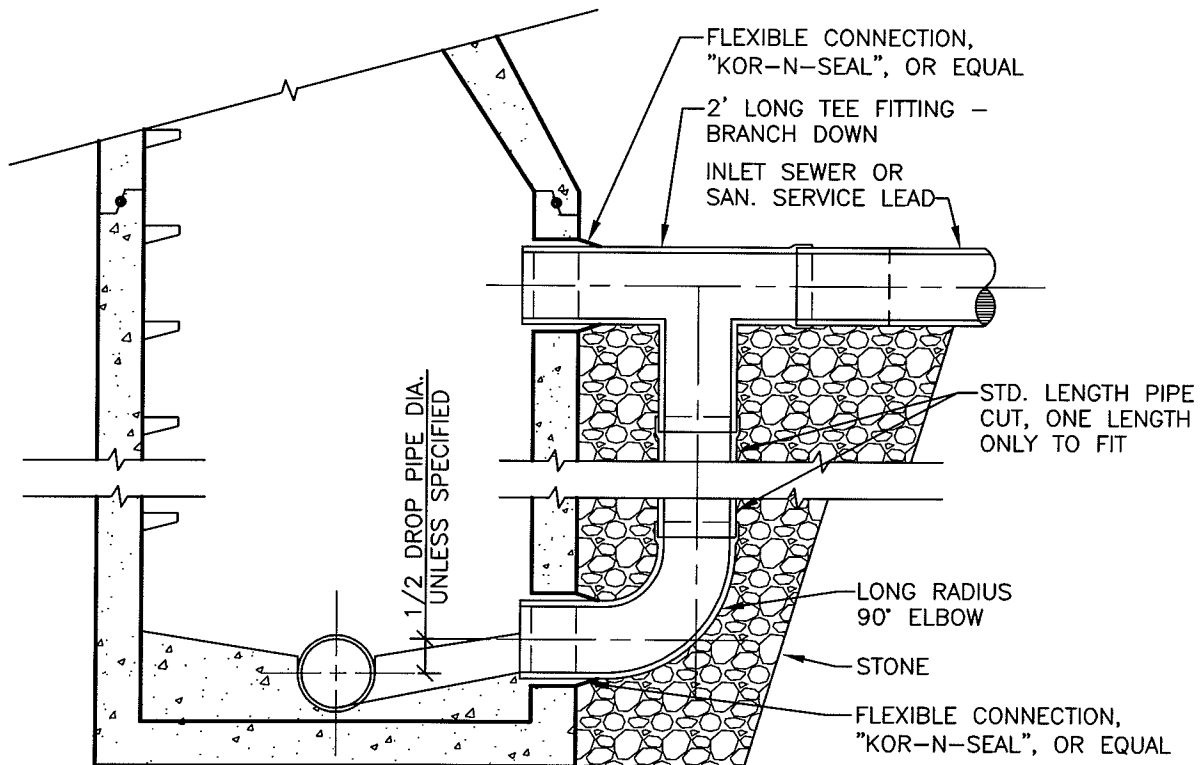
## Appendix 3



**STANDARD SANITARY MANHOLE**  
NO SCALE

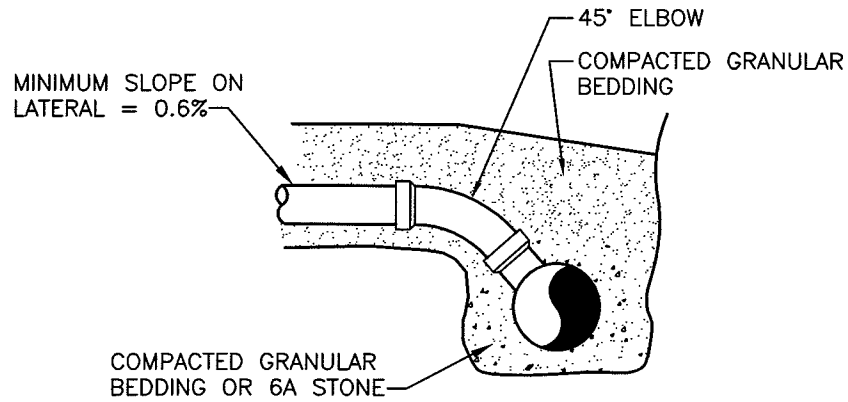
## Appendix 4

NOTE:  
FOR 8" DIA. SEWERS WITH DROP  
CONNECTION, THE DROP PIPE SHALL BE  
8" DIA. FOR SEWERS 10" AND LARGER,  
THE DROP PIPE SHALL BE ONE SIZE  
SMALLER THAN THE MAIN LINE.

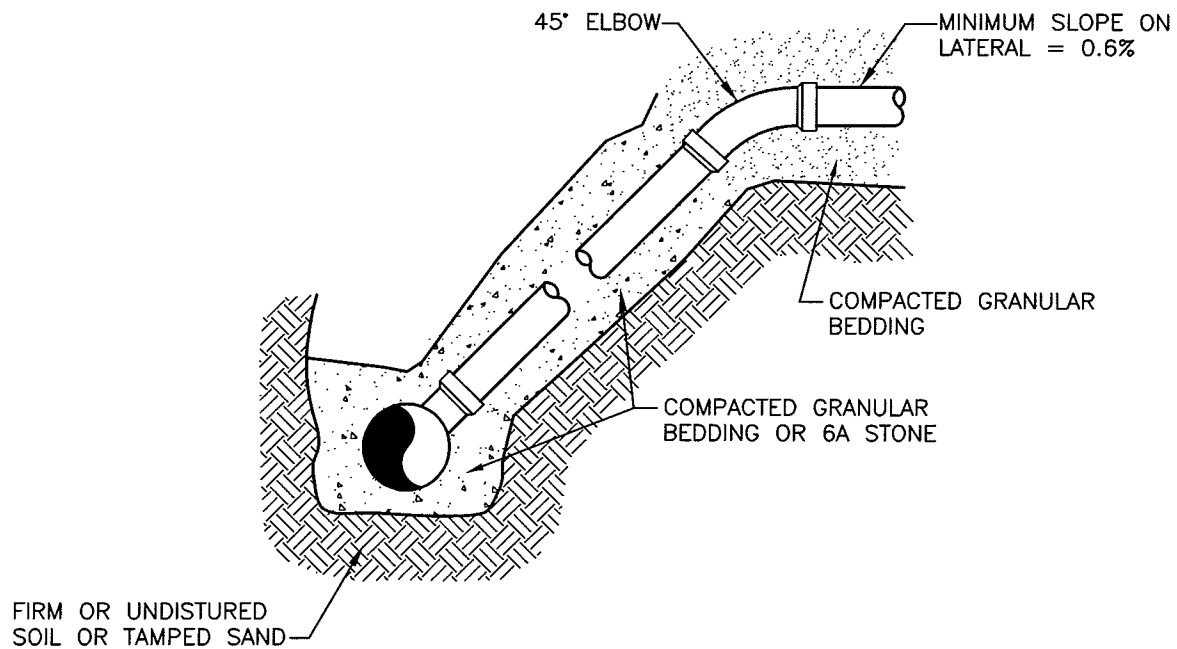


STANDARD DROP PIPE DETAIL  
NO SCALE

## Appendix 5



### HORIZONTAL CONNECTION



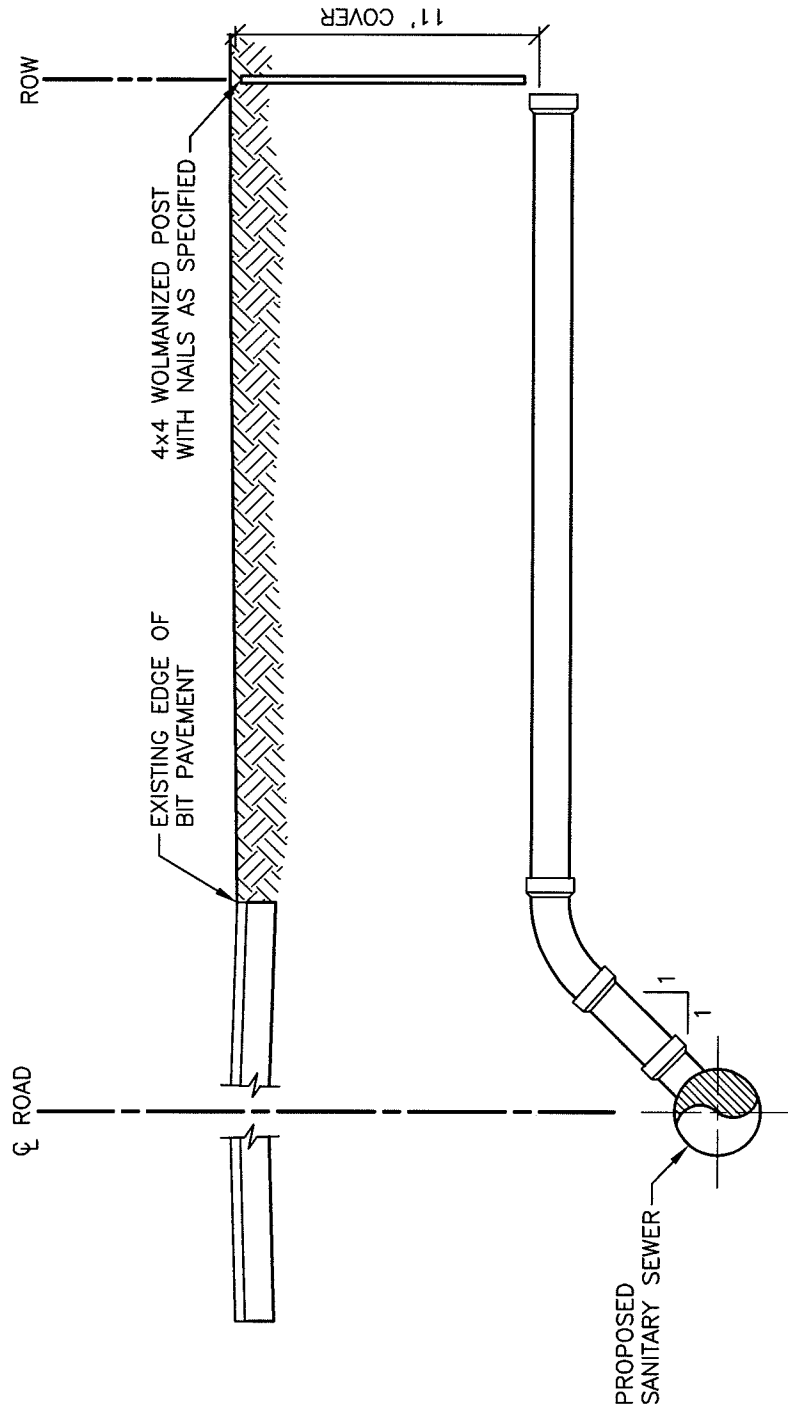
### VERTICAL RISER

## SANITARY SERVICE CONNECTIONS

NO SCALE

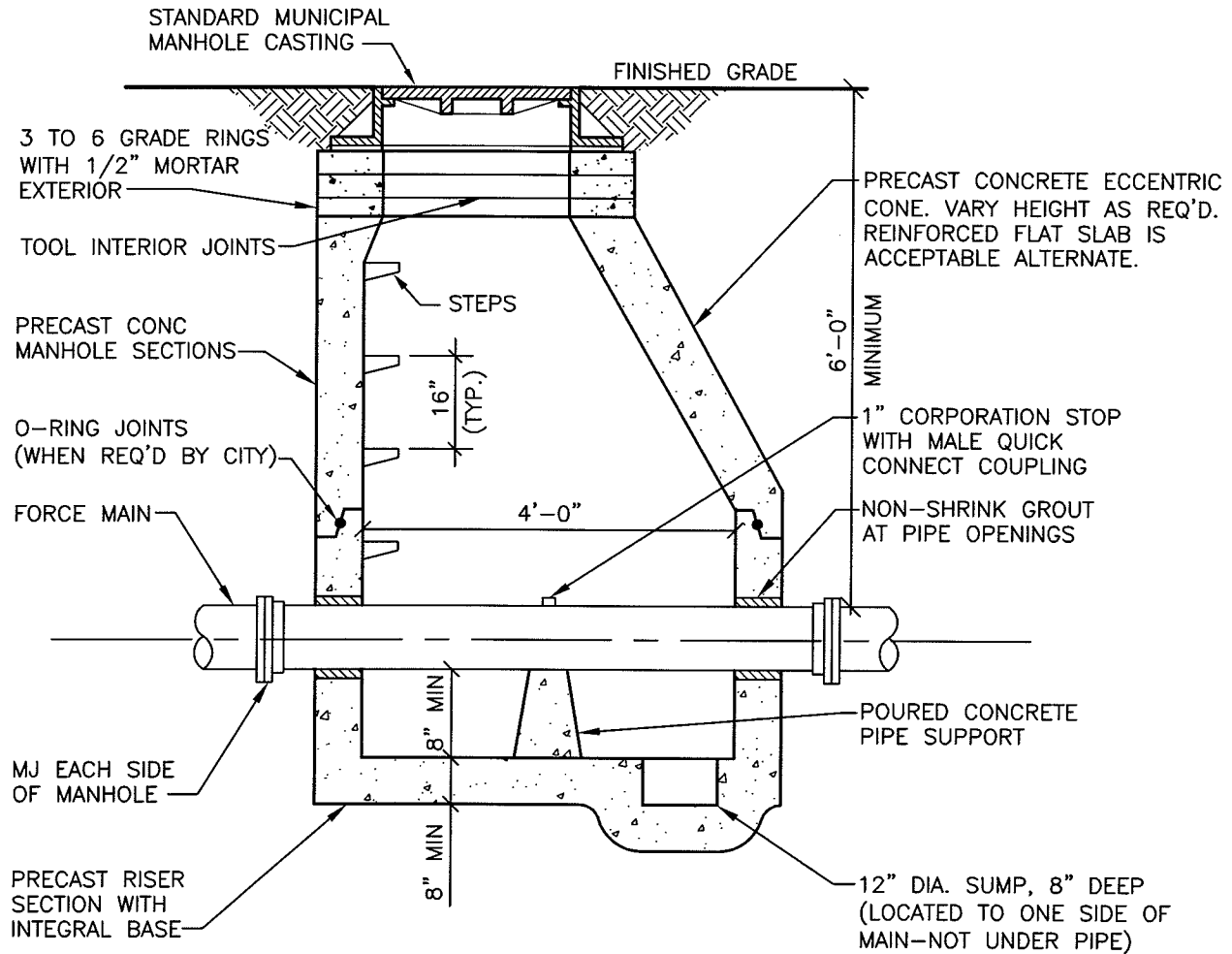
# Appendix 6





SANITARY SEWER SERVICE LEAD DETAIL  
 NO SCALE

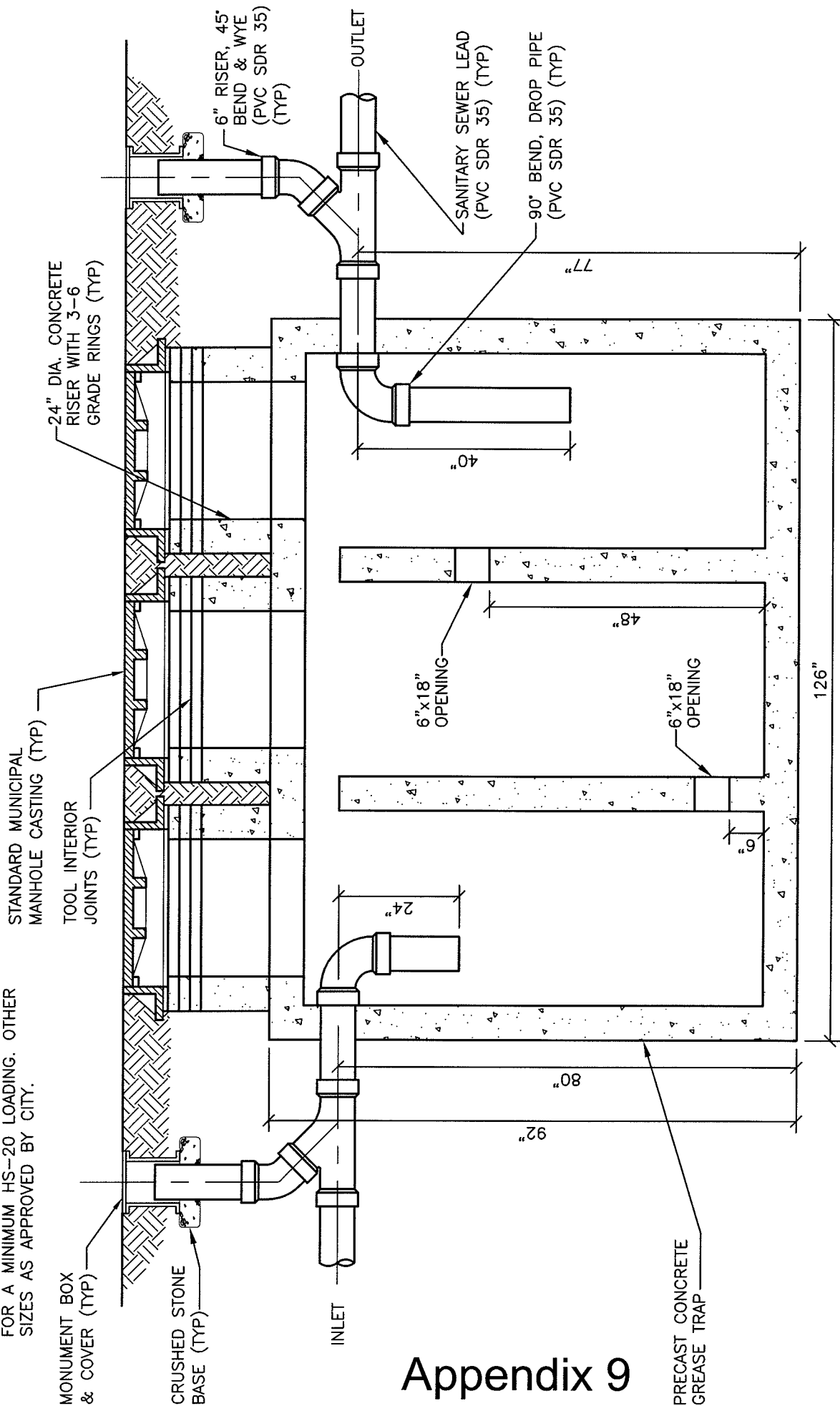
NOTE:  
THE CONTRACTOR SHALL FURNISH TO THE CITY (1) 25 FOOT, 3/4" I.D. DOUBLE LAYER REINFORCED RUBBER HOSE, WITH FEMALE QUICK CONNECTOR COUPLINGS ON BOTH ENDS.



AIR RELEASE MANHOLE DETAIL  
NO SCALE

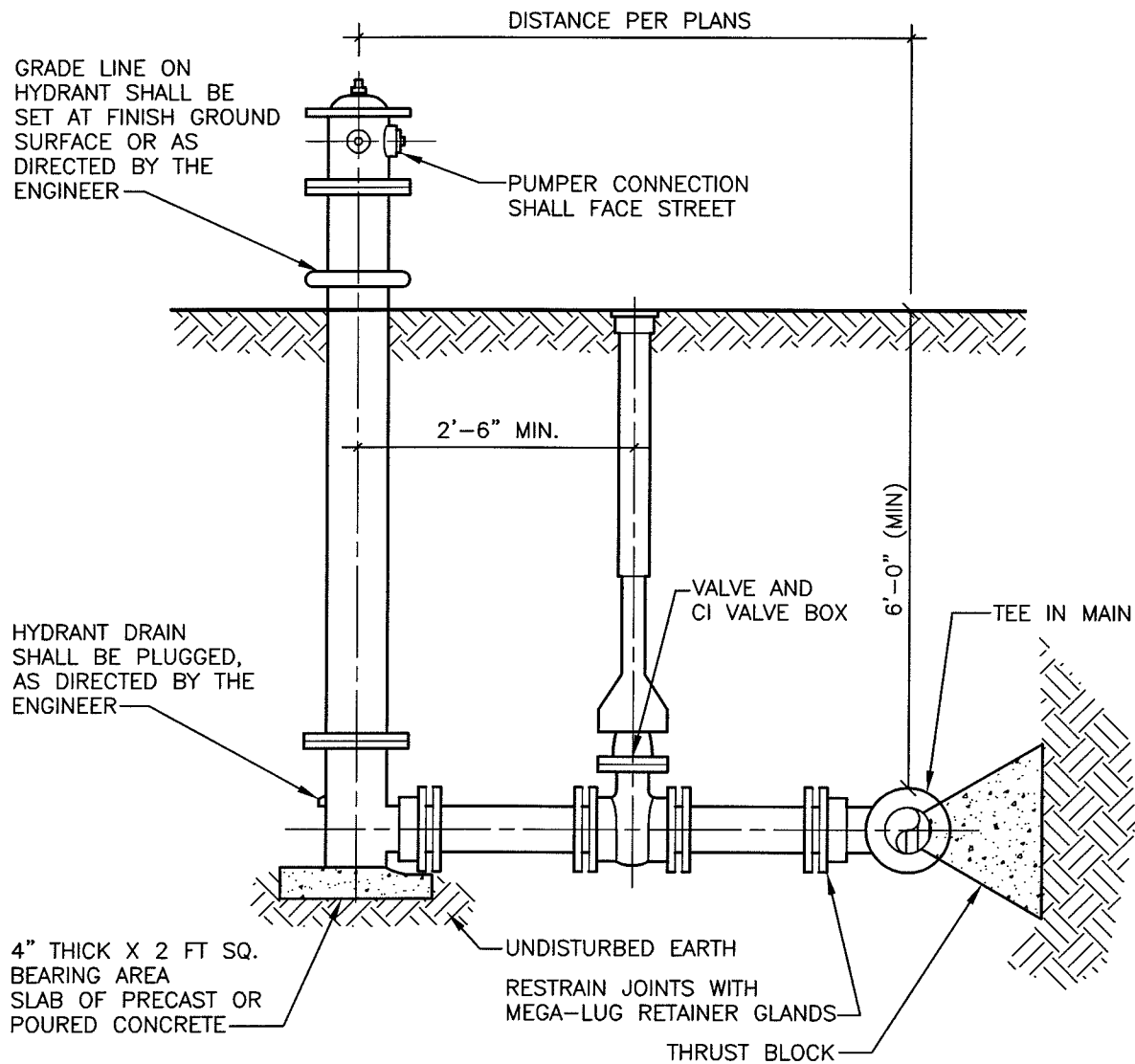
## Appendix 8

NOTE:  
2000 GALLON GREASE TRAP FOR  
NON-TRAFFIC AREA SHOWN. IN TRAFFIC  
AREAS, GREASE TRAP SHALL BE DESIGNED  
FOR A MINIMUM HS-20 LOADING. OTHER  
SIZES AS APPROVED BY CITY.



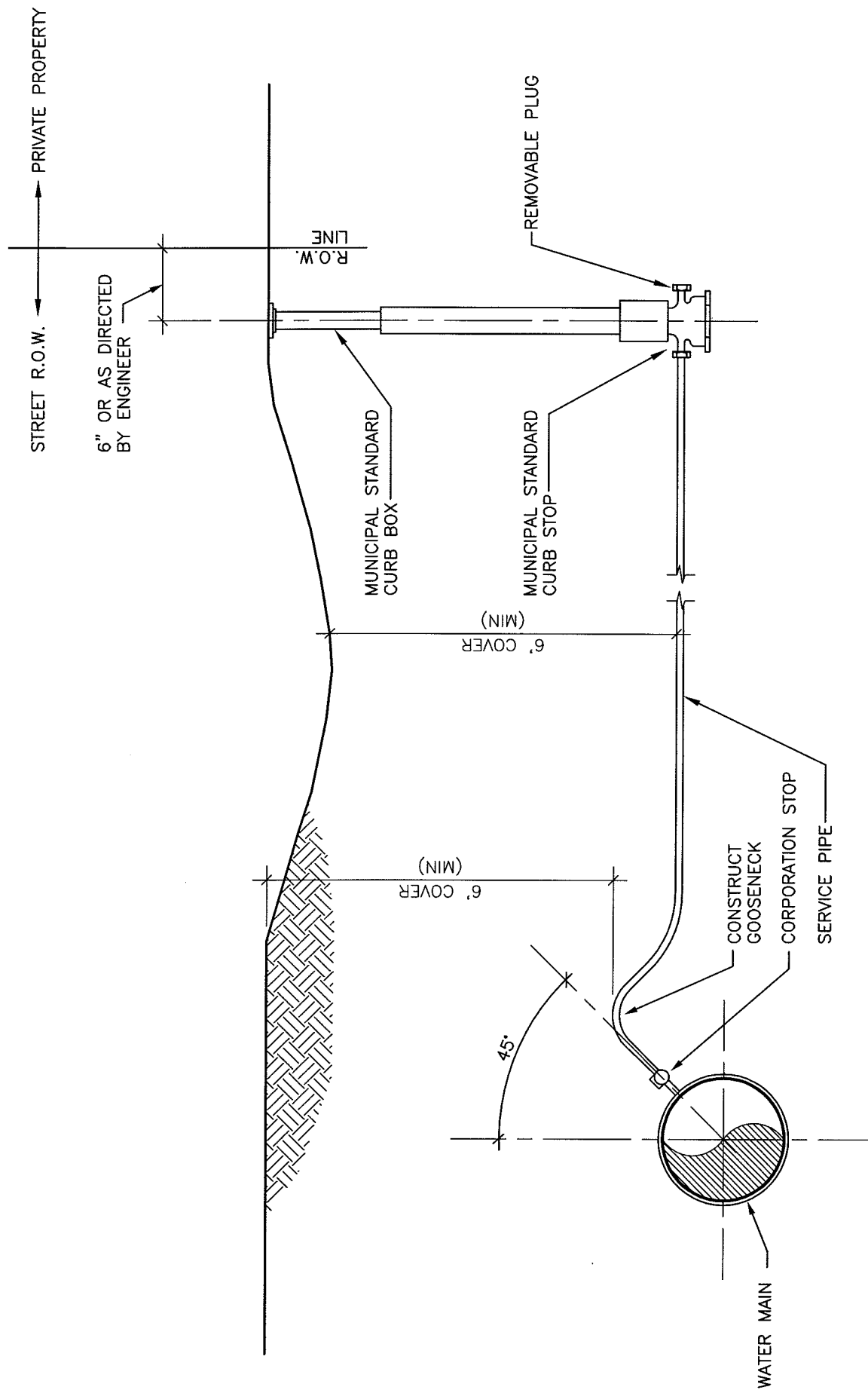
**GREASE TRAP DETAIL**  
NO SCALE

## Appendix 9

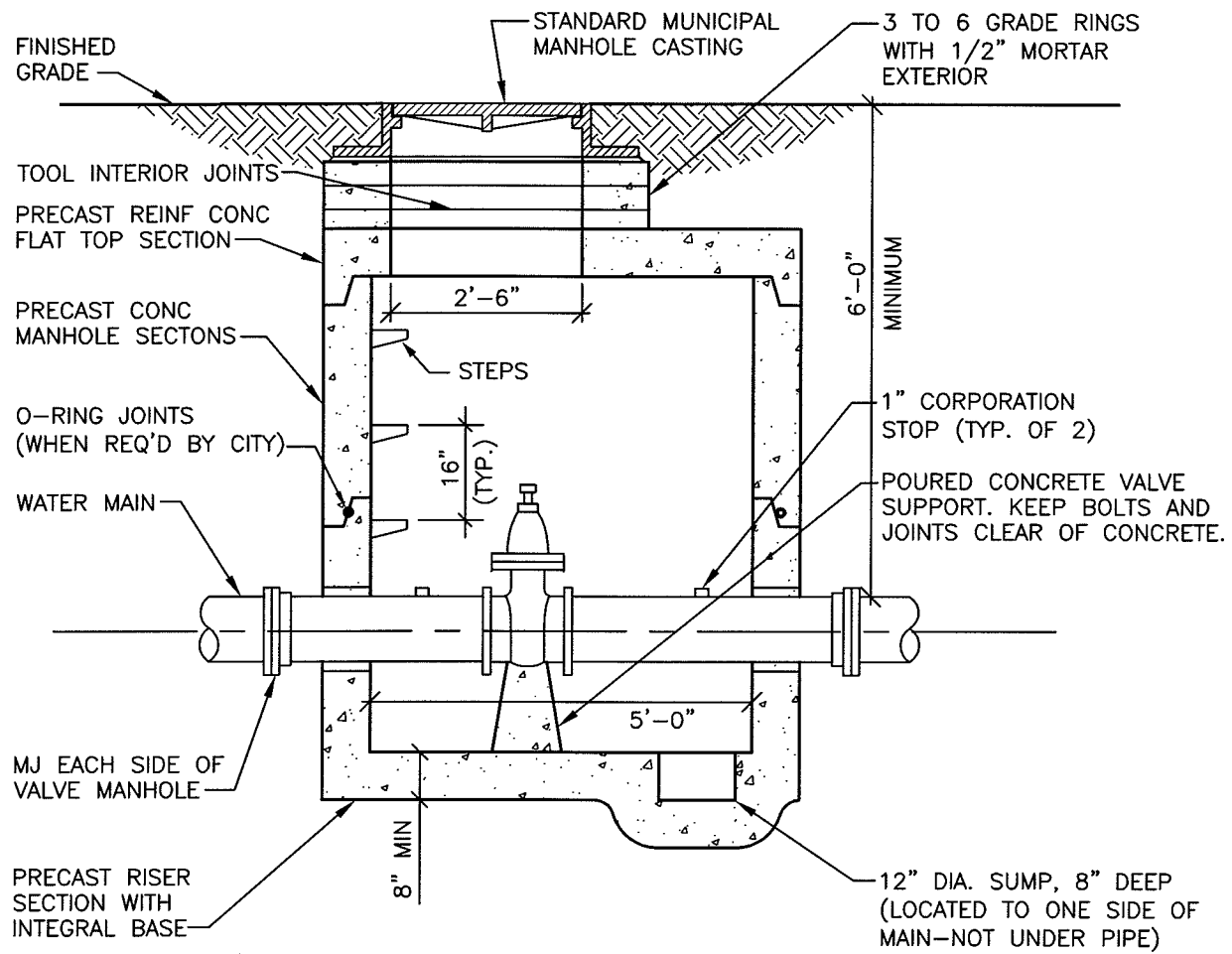


IONIA STANDARD HYDRANT ASSEMBLY  
NO SCALE

## Appendix 10



WATER SERVICE CONNECTION DETAIL  
NO SCALE



VALVE MANHOLE DETAIL  
 NO SCALE

## Appendix 12